Vol. XXV. Part 11.

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The Journal of the Department of Agriculture of Victoria, Australia.

Nov., 1927.

PRINCIPAL CONTENTS

Ensilage
Watering Lucerne
Wheat-Growing in the Mallee
Experiments at Rutherglen
Dairy Farm Buildings
Potato and Onion Pests
The House Fly
Treatment of Wood Borers
The Poultry Industry

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OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

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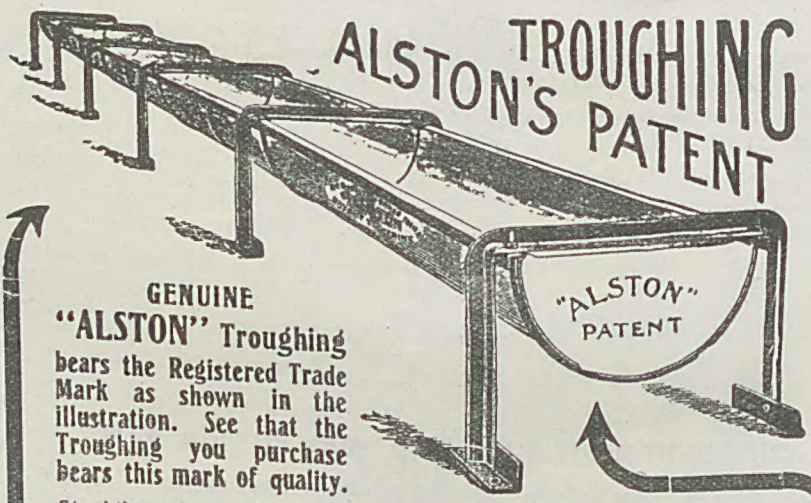

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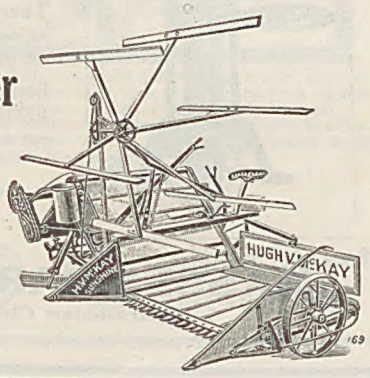

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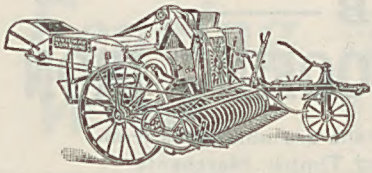

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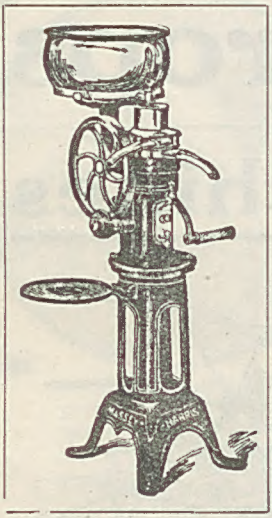

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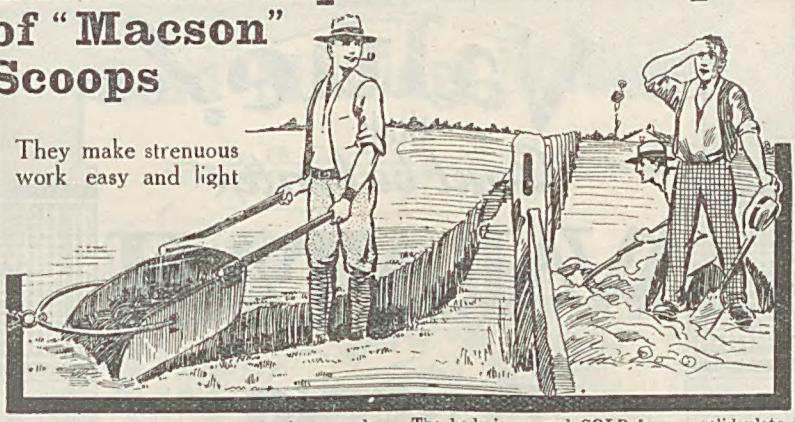

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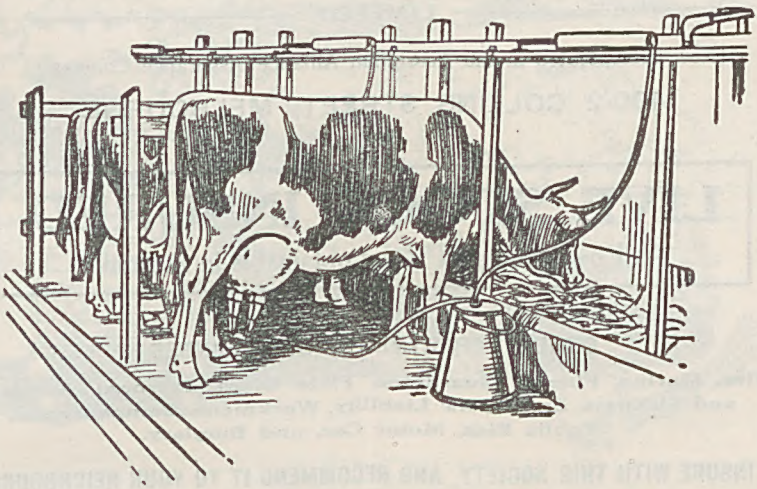

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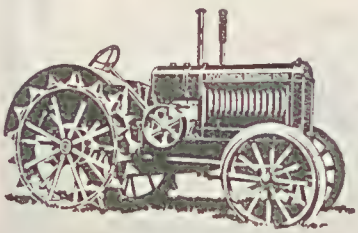

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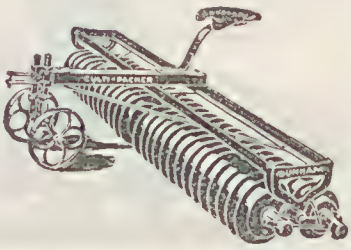

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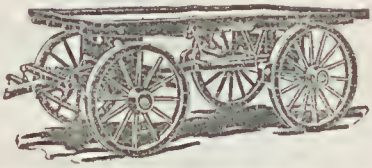

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Department of Agriculture

OF

VICTORIA.

Vol. XXV. November, 1927. Part 11.

ENSILAGE.

GROWING CROPS FOR ENSILAGE.

P. Ryan, B.Ag.Sc., Inspector of Agriculture.

The prolonged dry spell experienced in many parts of the State this year has emphasized again the urgent necessity of farmers paying more attention to the question of fodder conservation. Large numbers of sheep and cattle have been lost because of the failure to take advantage of good seasons to build a reserve of fodder that would carry stock through the dry period which inevitably occurs in the Australian weather cycle.

It is difficult to estimate how much the traditional policy of relying solely on pastures to supply needs of live stock has cost the State. In addition to the lamentable depletion of our herds and flocks in drought time, there is a less obvious, but still serious, national loss in the decreased production that follows a shortage of grass as a result of the absence of rain or a cold winter. There is scarcely a year that some part of the State is not affected in this way. Where provison has not been made to meet this contingency, by the conservation of fodder, the yield of our dairy herds is immediately reduced and this just at the time when the milk is of the greatest value. There is not only the actual loss of milk production during the time of shortage but, more important still, there is the difficulty of bringing back the flow of milk once it has been checked by shortage of food. In a like manner we have the loss of condition in our beef cattle and sheep. It can be definitely stated that the live stock industry of the State will not be placed on a satisfactory basis until much more provision is made for the conservation of fodder either in the form of hay or silage.

But before discussing the question of growing crops which are to provide food for stock in times of scarcity, attention must be drawn to the fact that, in a good season, an enormous amount of surplus grass goes to waste. Without much expense this could be converted into grass-hay which would provide a valuable standby in time of drought.

Ensilage or silage are the terms usually applied to the food material obtained by ensiling or storing succulent green fodder in receptacles or stacks in such a manner that it retains its succulence and a good deal of its colour. As the actual methods of silage-making will form the subject of another article, I do not intend to deal with them in detail. Briefly, it may be said that the process consists of storing the green fodder under pressure in a silo, stack, or pit, so that air is excluded, and regulating the resultant heat so as to prevent rotting or decomposition but yet to allow of a certain amount of fermentation.

The fermentation is mainly due to the presence of micro-organisms, and the principle of ensilage-making is to encourage the action of these micro-organisms to a certain stage and then to check or destroy them. When green plants are heaped together, fermentation soon begins and the temperature increases rapidly. The rise in temperature causes very great development in bacterial activity and fermentation proceeds very rapidly until the temperature rises so high as to destroy the organisms producing fermentation. By controlling the pressure on the mass of fodder, we can control the temperature and the rate of fermentation, and are able to produce either of two types of silage—acid or sour silage, or else sweet silage.

The great advantage of silage as a method of conserving fodder is that in it most of the natural juices are preserved. Because of this it provides succulence in the ration. In hay-making, on the contrary, preservation is secured by drying out the moisture, and, while this method supplies a marketable and easily handled commodity, it has the disadvantage of sacrificing the natural juices of the plant. It is important to note that the addition of water does not make up for the absence of these juices. Therefore, apart from its value as a drought ration, silage has a special value in supplying succulence to the ration when the grass has dried up.

Succulent feed is particularly necessary where the secretion of milk is involved, e.g., in the case of dairy cows or lambing ewes, and silage can be strongly recommended for both these classes of stock. Silage is rich in carbo-hydrates, but poor in proteins; therefore in providing a ration for a dairy cow in milk, it would need to be supplemented with concentrates such as bran, &c. The value of silage as a ration for sheep was proved in some feeding tests conducted at the Werribee Research Farm where it was found that no other fodder could maintain a sheep nearly so economically. A ration of 3 lb. per day will be sufficient to maintain a sheep. Other advantages of silage as a method of fodder conservation are that it is cheaply produced, can be kept for a number of years without deterioration, and is not subject to loss through fire, mice, &c.

Considering the many advantages of silage it is remarkable how little of it is made by farmers. Possibly the first cost of a silo is the greatest factor that militates against the more general adoption of the system. The cost of an overhead silo may appear large, but a brief consideration of the losses due to the death of stock, to say nothing of the money spent on purchasing fodders at drought prices, will be sufficient to prove that the expenditure on the conserving of silage is true economy.

Very many crops are suitable for silage, and soil and climatic conditions will largely determine which particular one should be grown. The requirements of a silage crop are that it should be cheaply produced, easily handled, and that it should provide a large yield of palatable, succulent and nutritious fodder. As important as the choice of crop

is the stage at which it is cut. To make good silage the material used must contain the right amount of sap. If it is too dry it is likely to char in the silo, that is, the heat which is generated in fermentation, while not actually burning the material, will reduce it to a charred condition in which it is more or less useless. If, on the other hand, the fodder is too sappy, a musty evil-smelling silage is produced. This is one of the reasons why rape is not suitable for silage making.

In districts with a winter rainfall and a comparatively dry summer, reliance will have to be placed on the winter-growing cereals—wheat, oats and barley—to supply material for silage making. Such crops make very good silage, and even when they have grown very rank they do not contain too much moisture. When these crops are grown for silage early sowing is recommended. Not only is a larger bulk of fodder obtained but in addition the silage crops can be handled before the rush of work at haymaking time. The varieties recommended are Algerian Oats, Cape Barley, and Warden or Huguenot Wheat. The rates of sowing recommended are:—Wheat, 1½ bushels; Oats, 2 to 2½ bushels; Barley, 2 bushels. Super. at the rate of 1 to 2 cwt. per acre should be applied at seeding time.

The best time to cut these crops for silage is after the heads appear and the grain is in the milky stage.

Combinations of two of these crops are sometimes used with satisfactory results. Another combination that is worthy of attention is that of field peas with either oats or wheat. These crops grow well in association, and the presence of the legume increases the nutritive value of the silage. Usually 1½ bushels of the cereal and ½ bushel of peas are sown per acre. Barley, owing to its earlier maturity, is not quite so suitable for combination with peas as wheat and oats.

In districts with a fair summer rainfall maize is undoubtedly the best crop that can be grown for silage. It will produce a large bulk of fodder which makes palatable nutritious silage. It should be sown in the spring as soon as the danger of frosts has passed and the ground is warm enough to give a good germination. Except on very hilly ground sowing in rows is recommended in preference to broadcast seeding. When sown in rows, inter-cultivation may be practised to keep down weeds and conserve moisture. The rows can be spaced from 18 to 36 inches apart depending on the fertility of the soil and the rainfall, and the seed planted from 9 to 12 inches apart in the rows. On some of the rich soils in East Gippsland a common method of planting maize for silage or fodder is to use the double-row maize-planter, sowing the rows 3 feet apart. These rows are then split by driving the planter between them leaving the rows 18 inches apart. Suitable varieties are Hickory King and Flat Red. If earlier crops are desired, some of the Flint varieties such as Longfellow or Ninety Day may be used. A mixture of 1 cwt. of super. and ½ cwt. of sulphate of ammonia per acre should be applied at planting time.

The best stage at which to cut maize for silage is when many, but not all, of the ears are dented or glazed, a portion of the husks dry, and the upper leaves still green. While the crop will contain a higher percentage of nutrients at a later period, there is danger of charring in the silo if allowed to mature beyond this stage. For harvesting, a maize binder makes an excellent job—taking off from 6 to 8 acres per day. On most farms, however, the amount of maize grown would scarcely justify the purchase of a binder. An effective home-made implement

may be made by attaching a sickle or blade to a sliding sledge. This is drawn by a horse close to the row and does good work in a crop which is standing up well. Maize for silage should be chaffed in pieces about an inch long, as in this form it will pack best.

Other summer fodder crops suitable for silage making are sorghums, Sudan grass, and the millets, but in districts in which maize can be grown successfully, the sphere of usefulness of these crops is limited. The great value of sorghums lies in the fact that they are hardier than maize, and will stand adverse conditions of soil and climate much better than that crop. They will thrive on poorer soil, will stand more frost, and are more drought-resistant. The silage when well made is excellent food, though lower in protein content than maize, and is relished by stock. Owing to the high content of saccharine juice it is slightly more difficult to make sorghum into sweet silage than maize. During the fermentation processes which occur, the sweet juices are readily converted into acids. However, when the crop is cut at the right stage and precautions taken to exclude air, very satisfactory silage results. The crop should be cut when the seeds have just begun to harden. If allowed to go beyond this stage the proportion of fibre rapidly increases. Varieties recommended are Early Ambercane for an early crop, and Imphee and Saccaline for late crops. The seed should be sown in rows 3 feet apart at the rate of 10 to 12 lb. per acre. The cultivation and harvesting are the same as in the case of maize.

Sudan grass and Japanese millet will both make good silage, but are really more suitable for use as fodder crops for early feeding off. Sudan grass, however, on account of its drought resistant properties, may be of value in districts where the summer rainfall is limited or uncertain. In moist districts, Sudan grass should be sown in rows 7 inches apart at the rate of 12 to 15 lb. per acre, while in drier districts it can be sown in drills at the rate of 6 lb. per acre. Of the millets, the Japanese variety has given the best results. It should be sown in rows 7 inches apart at the rate of 8 to 12 lb. per acre. Superphosphate at the rate of 1 cwt. per acre should be applied at seeding time.

In conclusion, emphasis must be laid on the necessity for thorough cultivation and rational manuring if maximum yields of silage crops are to be obtained. Early ploughing—so that moisture may be trapped—and shallow cultivation to produce a fine firm seed-bed are points that should not be overlooked.

MAKING ENSILAGE.

By H. C. Wilson, Manager, State Research Farm, Werribee.

Knowledge of the practice of ensilage making is very old. Agricultural history reveals that this method of conserving succulent fodder was known thousands of years ago. To-day, however, the majority of stock owners do not pay to the practice the attention it merits.

In seasons of scarcity similar to the one we are now passing through, the conservation of green fodder in the form of ensilage is of great importance to the stock owner. Well made and well preserved ensilage is a highly suitable food in drought periods or, for that matter, at any time of the year when natural pastures or sown forages are scarce. Sheep and cattle do particularly well on it, and, as a part maintenance ration, it can be fed with success to either horses or pigs.

At the State Research Farm, Werribee, it has been the custom for the past fourteen years to ensile approximately 200 tons of green fodder each year. This is held as stock food, and used as the necessity arises.

Oats and barley are the main crops produced at this farm for the purpose, but at times the first and last cuts of lucerne have been ensiled to advantage. Summer fodder crops such as maize, sorghums, millets, &c., are quite suitable for ensilage and are used in preference to the winter growing cereals in districts where they can be grown well, and at a reasonable cost per ton. Any green food that is reasonably palatable to stock and that can be harvested readily can be ensiled. Luxurious natural grasses or even weeds such as thistles, &c., are usually found to give good results after being well conserved as ensilage. The oats and barley crops at Werribee when produced for ensilage are sown either on irrigation land that has been growing lucerne for a number of years, and needs a rotation, or on well fallowed dry farming fields in the same way as if they were intended to be harvested for hay or grain.

An ideal winter crop, so far as good value is concerned, is a mixture of oats and peas, or oats and vetches, but these crops are somewhat difficult and expensive to harvest at Werribee. Crops of Algerian oats can be grown at Werribee and harvested and ensiled at a total approximate cost of £5 per acre. The average yield per acre is approximately 6 tons, and the cost of production about 16s. 8d. per ton. This figure includes rent of the land, cultivation, seed, manure, harvesting, chaffing, elevating to silo, and the interest and depreciation on the silo and plant concerned.

Cereal and other spring maturing crops suitable for ensilage are harvested in October or early November at Werribee. In the North of the State, October is the best month for this work, though late November may suit parts of Gippsland and the Western District.

We have often been asked by visitors at the State Research Farm if there is any need for conserving green fodder as ensilage at Werribee when green food is available to stock on the irrigation fields twelve months of the year. To such a question we are able to answer that well made ensilage is much more palatable and nourishing to stock than is green food in a watery stage of growth—a condition often met with during the early growth of crops or grasses. Again, the cost per ton of harvesting crops when at their summit of growth is low compared with the daily cost of cutting and carting to stock the required green feed ration for the day during all stages of growth. This is apart from the great convenience of having suitable stock food readily obtainable when it is most needed.

Crops should be allowed to come to maturity and yet be succulent before being cut for ensilage. Wheat, oats, and barley, if cut when approaching the hay stage, will supply the greatest weight per acre, and have the best food value as ensilage. Very little time should be lost in carting the green fodder to the silo after cutting with the binder or mower. Particularly is this the case in hot dry weather. Immature green fodder, if ensiled immediately after cutting, usually contains a percentage of moisture that prevents the necessary advanced curing so essential if sweet palatable silage is to be made.

Silos of the capacity of approximately 100 tons should be filled in about three days if possible with well matured green fodder. If this is

done after first having chaffed the fodder and delivered it by means of an elevator to the centre of the silo, very little tramping is necessary except during the latter stages of filling. Spreading, however, is always an advantage during the filling process; light and heavy material which usually separates in wind-eddies on its way down from the elevator is thereby well mixed, and matures much more evenly afterwards in the silo. After the silo is well filled and tramped, handy weights placed on the top will prevent undue surface waste; such weights need not exceed 56 lb. per square foot.

Ensilage well made can be used from six weeks onwards after ensiling, and will remain of good quality for many years if properly protected from the weather.

There are many methods of storing ensilage. Some stock owners prefer to stack the green fodder in square or round stacks in the open field without chaffing. This method is wasteful but has the advantage of doing away with the expense of erecting a silo. Excavations are sometimes made in the form of square dams in the field; green fodder is carted and stacked in these and finally covered with earth until needed by the stock.

But the most satisfactory method of all, if the expense can be met, is to chaff the green fodder into a well constructed silo of either cement or bricks and cement. Handy silos of approximately 120 tons capacity can be built, cylindrical in shape with an inside diameter of 16 feet, and a height of 30 feet above the ground surface, as well as 6 feet below the surface as a foundation.

Green fodder placed in such a silo to its full capacity and well tramped will sink at least 4 feet in a few weeks, and probably at the end of twelve months will have settled 6 feet below the top of the silo. Well made ensilage stored in a silo such as that described above will, twelve months after ensiling, weigh approximately one ton to every 50 cubic feet, or about five times as heavy as well cured oaten hay after twelve months in the stack.

Cylindrical silos constructed of either bricks or cement should be reinforced and built watertight, outlets 3 ft. by 2 ft. should be arranged for at 6 ft. intervals down the protected face of the silo. Loose doors constructed of well seasoned wood faced with tarred galvanized iron should be fitted to each of these outlets to prevent loss. It is also necessary to cover the silo with a waterproof roof strong enough to resist high winds.

Before the silo is opened and the ensilage fed to stock the whole of the weights should be removed from the top and the first few inches of the ensilage carted away as waste. Very little will be wasted, however, if the final tramping is well done when making.

It is particularly advisable to take all ensilage needed for stock evenly from the top of the silo, so as to prevent the unnecessary aeration and waste and the possibility of which occurs if holes are dug in the surface, and the ensilage removed unevenly.

Ensilage should be fed to cattle in troughs which are on dry ground convenient to approach, clean and sheltered, if possible, from violent winds. A daily ration for dairy cows in milk is approximately 15 lb. fed with a little oaten chaff and bran. A maintenance ration for dry cattle would be approximately 20 lb. with some dry food either from the paddock or fed in the form of good clean straw.

Four-tooth Comeback wethers were maintained at the State Research Farm from August to September, 1926, on a daily ration of 2½ lb. of well made oaten ensilage per head. These sheep held their weight on this ration alone, as they were confined to a small yard growing no grass.

Ewes that are about to lamb given a daily ration of approximately 3 lb. each will do well if a little dry grass, good water and salt licks are also available to them. Wethers have put on weight at Werribee at the rate of 1 lb. per head per week when fed on a daily ration of 3 lb. of oaten ensilage. If this ration is increased to 4 lb. per head with ample dry feed and a good water supply, condition will be put on rapidly by healthy sheep. This last ration means only 1 cwt. per head per month and the approximate cost of the ensilage would be 10d. per month, or 2½d. per week, which is, without doubt, a low rate in times of scarcity.

Silos are very useful, and, in my opinion, necessary on a dairy farm, but I am convinced that their necessity does not stop there. Ensilage can be preserved indefinitely. It is cheaply made. It is free from the ravages of mice, and is succulent, palatable, and readily digested by stock. I would like to urge all men on the land who are interested in stock to give consideration to this matter of ensilage making. Those that have not yet experienced the wonderful feeling of safety that a stock owner has when he possesses a good supply of well preserved ensilage in times of scarcity should give the practice a trial at the very first opportunity.

WATERING LUCERNE.

By L. C. Bartels, B.Ag.Sc., Senior Irrigation Officer.

Investigations of the factors governing the growth of lucerne demonstrates that water is the most important. It takes 600 tons of water to produce 1 ton of lucerne hay. This has been determined many times in carefully controlled experiments, and it should impress irrigation farmers with the need for careful irrigation.

In this season, particularly, lucerne is at a premium, and to secure best returns from the stands, either by cutting or grazing, particular attention should be given to watering. In irrigation a lot depends on the irrigator; he must endeavour to give the lucerne sufficient water, and he must avoid giving it too much, because, as every lucerne-grower knows, the crop is very susceptible to injury through excess watering. Lucerne is peculiar in this regard. It has a high water requirement, but dies out quickly on a water-logged soil. It will not thrive in a humid climate, but is resistant to dryness. It grows to perfection in the deep soils of dry districts under irrigation.

How then, must the farmer order his practice to get the best results from lucerne under irrigation? He may do so as follows insofar as watering is concerned:—Firstly, by the careful lay-out, grading and check-banking of his land to secure an even distribution of water with a minimum of trouble. Secondly, by regular watering. Thirdly, by adequate watering; and fourthly, by avoiding excess.

How may these objectives be achieved? I shall endeavour to treat them in detail except that I do not propose, in this article, to describe the methods adopted in grading land for lucerne. But, to distribute the water, most irrigation land must be graded and check-banked. What is known as the Border system of irrigation is in common use here. Under this system the land is divided into long, narrow bays bordered by check-banks which run down the greatest slope. From one inch to three inches per chain makes a desirable slope. In porous ground it may be greater. The bays are levelled from side to side. This involves shifting earth from the higher side to the lower, and it is obvious that the amount of earth to be shifted depends on the side slope. Where there is a marked side-fall the banks are constructed closer together. The length of the check-banks is governed by the slope; on steeper grades they may be longer than on flat grades, while on porous soils the bays should be shorter than on heavier land. Usually they are from six to ten chains long and from a half to one chain wide.

When the water is let in from the channel at the head of the bays it should spread from side to side as it moves down the bay. When it has reached a point from which, in the judgment of the irrigator, it will run to the end, it should be cut off.

It is not necessary to dwell on the importance of grading, because it is plain that the ease with which watering may be accomplished will depend on the care taken in preparing the land. This applies with particular force to lucerne because it will occupy the ground for years, and the crops will reflect the evenness of the watering.

When lucerne has been established on well graded land, it is usually not watered very freely during its first season. But, in the second and subsequent years, it should be watered regularly to promote even and continuous growth. It is in this regard that many farmers fail. They wait till the lucerne is showing a wilted condition before watering. But, if the crop is checked through dryness and hardens off and develop flowers, watering will not cause it to resume growth, but rather a new crop will develop. Lucerne should be kept growing without check through dryness.

The soil soon dries out to a considerable depth and, when the heavier textured soils are dry, it is difficult to get the water to penetrate. The consequence is that, in many soils, the moisture through irrigation remains near the surface, the feeding roots are restricted to the moist soil, and the deep rooting habit of the plant is of little advantage.

The work at the Werribee Research Farm to determine the best rate and frequency of watering for lucerne indicates that six waterings per season are desirable. These may be distributed as follows:—One watering between the first and second cuts, two between the second and third cuts, two between the third and fourth cuts, and the sixth after the fourth cut. Of course, under other conditions, the number of waterings necessary would depend on the permeability of the soil. The six waterings referred to above totalled two feet of water per acre.

This brings me to the question of what is an adequate watering. If sufficient water is available, it may be laid down that 2 feet per acre in addition to rainfall is necessary for best results, and, in the experiments referred to, it was ascertained that the amount of lucerne produced per unit of water was greatest when 2 feet of water was

applied. Lesser quantities of water, say 18 inches, gave a big increase in yield over that produced on unirrigated land, and extra quantities of water, even up to 4 feet, gave progressive increases in yield. One might ask—Why stop at 2 feet if heavier watering gives added yields? Would the extra yield offset the extra cost? It would; but when one applies 3 feet and 4 feet of water per annum it is excessive. It induces a rank growth of lucerne for a year or two, and soon the crop thins out. The high yields are not maintained and the hay produced is of inferior quality. But when 2 feet of water is given, divided into six applications, a steady growth is maintained, the hay produced is of the right quality, the best returns per inch of water is obtained, and the stand grows for years with unimpaired vigor.

If a grower cannot get 2 feet of water per annum for his total area of lucerne, would it be better for him to confine himself to an area to which that watering could be given? In this connexion I would say that it would be more profitable to give the lesser quantity, say, 18 inches over a wider area.

The value of the irrigation water applied annually is governed by the amount applied at each irrigation. In the Werribee tests we applied quantities varying from 18 to 48 inches per acre per annum. We found that, for the average, 2 feet was best, but the efficacy of the 2 feet depended on the frequency of irrigation. We compared it in six lots of 4 inches, four lots of 6 inches, and eight lots of 3 inches, and the division into six lots was the best arrangement. It keeps the lucerne plant on the move. Four waterings in the season did not; and although eight waterings certainly promoted steady growth, three inches at a watering did not penetrate the soil deeply enough and must have restricted the zone of root development. Of course, 6 inches went down satisfactorily, but the plants were alternately surfeited with and thirsting for water when only four irrigations were made.

From the comparison emerges these facts which I would like to impress strongly on all growing lucerne under irrigation. You must keep the lucerne growing and you must get the water into the soil. How many growers ever worry whether the water penetrates to any considerable depth? The great majority are content if they get a good distribution on the surface and many seem to be indifferent even about that. Sometimes, on the porous loam soils, the ground takes water readily, and there being good under-drainage, the lucernes grow to perfection. The farmer then is apt to pride himself on being a good lucerne grower, but he deserves no more credit than the man who gets only scanty growth on a less porous soil.

The absence of soaking winter and spring rains during the last three years has had a big influence on the growth of lucerne in many parts. The sub-soils have been dried out by the crop, and the difficulty of getting irrigation water into the soil has been increased, hence the frequency with which we meet cases where the lucerne will not grow. I want to suggest that in most cases, if not all, conditions will be improved if greater attention can be paid to watering. In some districts—as at Swan Hill—it is the lack of manures which restricts the growth. But if a farmer topdresses regularly with superphosphate, and still the lucerne is stunted, it is most likely the lack of

penetration of water which is the cause. It may be noticed that the trouble is most marked on the slopes; on flat grades and at the foot of the slopes the lucerne is better developed.

During the last two or three seasons I have seen many instances where greater endeavour on the part of irrigation farmers has been rewarded by better growth. One may advise those whose lucerne does not grow properly to try a supplementary watering each time they irrigate; that is always providing the land is well graded and water does not lie. For comparison, only one or a few bays may be so treated and the others watered as usual.

One meets objections sometimes. A farmer will listen patiently and then protest, how can I do that on the portion of my land where water lies? No one would suggest that he should. If water lies, the lucerne will die out. That is the one condition which the plants will not tolerate. If grading has been carefully done, and the water still lies, then it would be better to sow mixed grasses and clovers on such an area. This question of adequate watering resolves itself into one of how to get the water into the soil—particularly into clay loam soils which comprise such a big area of the irrigated lands in the Goulburn Valley and elsewhere. We have had positive results from the use of gypsum, and I suggest to any farmer who is disposed to try it, that he should treat an area of his lucerne land running across the bays for comparison with the untreated land. Quantities from 1 ton per acre upwards should be used.

A soil auger should be part of the outfit of an irrigation farmer. If he uses it, he will have a much better understanding of what happens in the soil.

The use of excess water is the worst fault to be encountered. Though lucerne requires so much water for its proper development, it cannot endure too much; it will quickly die if water lies on it too long. It will not develop properly if the water table is too high, and although it may be unprofitable to use too little water, the use of too much is far worse, because—apart from the bad effects on the lucerne—the land is often spoiled.

It is plain that if irrigation water is to be of use to lucerne, it must get into the soil, but must not pass beyond the roots. Losses through run-off and deep percolation must be reduced to a minimum. Loss by evaporation is kept down by maintaining a steady growth of lucerne, so that it covers the ground. It is remarkable how effective top-dressing is in this regard. This is a benefit from manuring which is not often stressed, but it is clearly demonstrated in our tests in the country. Superphosphate reduces the water cost of lucerne hay.

Losses through run-off depend mainly on the irrigator. Some loss is almost unavoidable, and provision should be made for drainage at the foot of the bays. In some of our irrigation settlements a general drainage scheme has been adopted to carry off excess surface water, but this is not a licence to over-water. It will only aggravate the trouble if settlers think they may pour water on the land with impunity. It should be unnecessary to stress the evils of over watering in porous soils. In some of our irrigation settlements there is, unfortunately, too much evidence on this point. In Mallee soils, which are porous sandy loams, the water is absorbed readily. For a start these soils are very productive, and the free watering may go

on for a time with impunity. The inevitable consequence, unless there is under-drainage, is that the water-table rises, bringing salt troubles.

Even where drains are installed, it is foolish to depend on them to offset excessive watering. Recently I met a settler who told me that his tile drains ran at full capacity for a week after he irrigated; he rather prided himself on the efficacy of his drainage system. There are districts where a rising water-table is a menace to the settlers.

It should be made clear that in recommending a supplementary watering to enable water to pentrate, this is necessary only on the clay loams, or on soils where the water does not readily enter.

In regard to the time of watering, i.e., whether it is better to water before or after cutting, it will have been noted that six waterings per season necessitate two waterings between the second and third cuttings and two between the third and fourth cuttings. This refers to the heavier soils. Porous soils which absorb 6 inches of water and more should not be watered so often.

To summarize, it should be pointed out that:—

Good grading will help to secure a proper distribution of water and the development of even crops.

Lucerne must have sufficient water to give high yields.

The soil should not be allowed to dry out between irrigations.

If lucerne is checked unduly for want of water, subsequent irrigation will not renew the growth. Fresh shoots will develop.

About 2 feet of irrigation water per annum will give good results. It should be applied in six waterings. At least 4 inches should be given in an irrigation.

Excessive water will be wasted and may cause damage to the plants; the quality of the hay is poorer and the life of the stand is shortened.

The appearance of the plants is a good guide as to when to irrigate. The lucerne should have a light green colour.

Keep the lucerne growing without check through dryness.

DAIRY-FARM BUILDINGS.

By J. M. Kerr, Chief Dairy Supervisor.

In this article it is not proposed to give detailed instructions in the construction of each building used in connexion with dairy farming. There are many details common to the construction of all wooden buildings whether on a farm or anywhere else, and which it would be superfluous and useless to draw any attention to. There are, however, some directions in which a little previous advice may make a considerable difference to the utility, convenience and general effectiveness of the buildings for their respective purposes. It will, perhaps, be more to the point for me, instead of entering into a tedious reiteration of details that are commonplace, to confine myself rather to what to avoid and how to avoid it.

Commencing with the dwelling and its relationship to the general house layout, I would advise that it be placed not too far from the farm-yard, where most of one's work lies. Of course, sanitation requires that the dwelling be not too close to the animals' quarters, but there is no sense in flying to the other extreme. There is certainly no need for it to be more than 50 yards from any other building excepting the pigsties, which should be at least double this distance away. Choose neither a very high nor a very low site for the homestead. A very high site means a heavy tax on the milking cows which have to come to the milking-shed twice a day, and it also imposes unduly heavy horse haulage in bringing in the farm crops. Of course, a more or less elevated site is desirable, but all that is actually necessary is that the site will throw off, rather than attract, surface drainage.

Three points to be observed in placing the dwelling are:—

1. It should be well away from the fall of farm yard drainage.
2. It should face the farm approach.
3. It should occupy a position at least equally forward with the out-buildings.

It is always a mistake to require a visitor to come, through the farm-yard and outbuildings to reach the front door; it is much better to let it be reached through a garden. No farmer can afford to dispense entirely with the pleasures of the eye about his home, and any aim for this is certainly as well directed towards the home beautiful as to the cow beautiful. To my mind, it is a glaring anomaly for a farmer to spend time and money in striving for more or less superfluous beauty in his cows before he has removed the more conspicuous ugliness of an aesthetically neglected home. If a farmer is one who receives any inspiration from beauty of environment then, to him, beautiful environment is worth while and the most practicable, the most serviceable and most unselfish place for him to cultivate it is in the immediate home surroundings, where it will be shared by every member of his household. Beauty is pleasing everywhere, but in the home it takes on a real value and becomes an actual utility.

A farmer should not decide on the site of any building without an eye to the future complete building-scheme layout. The position of each building should be considered in its relationship to others that may be expected to follow, and in relationship also to the scheme of farm-yard drainage. In the interest of both sanitation and convenience the most suitable site for milking-shed, silo, dairy, stable, feed-house, hay-barn, implement-shed, workshop, manure-pit, &c., should all be determined upon by the farmer before he begins to build any one of them. He should try to avoid having to place drains where they will have to be crossed frequently by traffic. If this is unavoidable the drains must be made strong at the crossings to enable them to withstand the damaging action of wheels.

Before dealing with any particular building I want to recommend generally the projecting eave for all farm buildings. The overlapping roof gives many advantages. It certainly adds to the appearance. The extra cost is so slight as to be not worth considering, and it is certainly returned many times over in the greater durability of the protected walls. With a projecting eave a leaky spout does not necessarily mean a rotting wall and wall-plate, as it invariably does

when the roof ends flush with the wall. It shades the wall not only from the rain, but also from the hot sun, and thus makes for a saving in paint as well as for a more temperate interior. The projecting effect is obtained by cutting the rafters long enough to project beyond the wall the preferred distance, which may well be as much as 18 inches on any building, and considerably more on a dairy, where coolness is required. In this type of eave the spouting is, of course, attached to the end of the rafters.

Milking-Shed.

A very essential building on the dairy-farm is the milking-shed. Its object is mainly to protect the workers from unfavorable weather. Cows must be milked twice daily in the worst as well as in the best of weather, and the milker who has an ill-designed or ramshackle shed to work in is not to be envied. The design of the building should provide for total exclusion of rain and more or less effective exclusion of wind, but there should not be one bit more exclusion of air than is necessary for the reasonable comfort of the workers. Freshness of atmosphere must be preserved at all costs and at all times. In our climate one whole side (preferably the east) can well be left quite open. The ideal site for this open style of shed is an eastern slope so that the open side faces down the hill. This ensures that the surface drainage from the receiving yard will not be towards the building, and it also makes for a dry approach to the stalls—a very important matter. The bails (any number) are arranged in one single row so that the cows walk straight in and stand facing into the shed. A bail for each cow in the herd is ideal, but if the floor is as good as it should be and a farmer has a sufficient sense of the cleanliness required, each bail may be used for several cows in succession without undue fouling.

Many sheds are unnecessarily uncomfortable in wet weather through the roofing not being carried far enough out behind the cows. Aim at having a dry impervious floor always for at least 4 feet back from the cows. This requires a roof extending 6 feet behind the cows. Never have it less, because, on a floor which is as good as it should be, this is the part where the cows are most liable to slip; consequently it is the part that it is most necessary to keep dry. For the same reason the usual gutter at the rear should always be close up behind the cows, which in practice means never more than 5 feet 6 inches from the front bail-fixing. Another point worth while is to dispense with the usual roof-supporting posts behind the stalls. Posts standing anywhere behind the stalls are unnecessary and dangerous obstructions, and often cause injury to the cows. Cut them out altogether by sloping the roof to the rearward and supporting its lower portion mainly on the rear or leg-roping posts, using brackets out from these posts to support the 6 feet of overhang. There is no sense in making the stalls less than 4 feet in width. Personally, I think for hand-milking a centre to centre width of 4 ft. 6 in. is preferable in every way. If leg-roping is to be practised the leg-roping post should be fully 6 feet back from the front bail fixing, that is to say the stall should be 6 feet long. A mistake commonly made is in placing the bail opening to the left side of the stall. This is comfortable neither for the cow nor for the milker. Always place the bail opening towards

the right hand side of the stall, and never, under any circumstances, further leftward than the centre.

The best floor for a cowshed is either cement concrete or good hard bricks grouted in cement. The floor should include the shallow gutter previously mentioned and be given a fall of 1 in 40 thereto. This gutter should extend along the rear of the whole row of bails and be continued far enough outside the shed to whatever distance is necessary to ensure sanitation. The safety point will, of course, vary with the fall available, but in any case the receiving drain should be enclosed with a fence on each side to prevent access of the milking cows. The protection should continue to a point beyond where all visible moisture ceases. No milking-shed should be built nowadays without a space being reserved for an elevated bench on which to stand the receiving pails. For building material for a milking-shed there is no need to look further than weatherboard for the walls and galvanised iron for the roof.

Milk-Room.

Another building no less important is the milk-room, which on a milk supply farm will be used to cool the milk in, and on a cream supply farm to do the separating in. The distance this building should be from the milking-shed has to be a compromise between the two needs of farm convenience and farm sanitation. On some farms 30 yards would be too close, on others 10 yards would be unnecessarily far. The main thing about the site is that it be easy of drainage and in a clean atmosphere. With regard to the building the same details apply everywhere, viz., an overhanging roof for shade, smooth internal walls and ceiling, roominess, floor impervious to moisture, fly-proof, and adequate ventilation. There are some points worth adopting in the construction of any building that is to be used for the treatment of milk. One is not only to make the floor of concrete or similar non-absorbent material, but to continue the same material upwards at the walls to form the bottom 8 or 9 inches of the walls and take the bottom wall-plate. This permits the floor to be sluiced out without the water coming anywhere in contact with wood. Another point is to round off with the concrete the angles where wall meets floor. This facilitates cleaning. Still another is to construct the wall vents with the inner opening higher than the outer so that the entering air may precipitate its dust in turning upward, and finally, always give the floor a pitch of at least 1 in 40 for drainage. It is generally most convenient to make the drainage exit at the door, and the drainage should be effectively conducted to a fenced-in area at a sanitary distance from the building. Where the separator is in use every day it is better in a separate, but similarly constructed building closer to, but never inside the milking-shed.

Stable.

Another necessary farm building is the stable. It is usual and desirable to provide a stall for each horse in use. A horse-stall should be at a least 7 feet long and fully 5 ft. 6 in. wide. Sufficient room, say, 8 feet, should always be allowed behind the stalls to allow of the

horses backing out conveniently. While being weatherproof in all seasons, the building should also be airy and well lighted. A stable entrance should not be less than 7 feet high and 4 feet wide, and should preferably be on the least weather-beaten side which, in most places, is the east. Stable floors need to be of some resistant material, but an overhard floor is apt to be too severe on the horses when they stamp. For this reason neither brick nor concrete is quite satisfactory. It is questionable whether there is any better floor for a stable than lengths of sawn and seasoned hardwood timber which will give a floor depth or not less than 3 inches. The width of each piece may be anything from 2 inches upwards but 3 inch by 2 inch timber serves quite well. They are, of course, laid on their edge, tightly together and right down on the solid ground or tamped ground filling. No wooden bearers are required nor are they advisable. The closer the pieces bear on the ground the better. A fall rearward of about 1 in 50 should be given in the stalls, and a close fitting slab or brick gutter provided behind the stalls to convey the drainage well outside the building, to link up, if practicable, with the cowshed drainage. The object should be to save the liquid manure in one common manure pit for subsequent use on the land, either mixed with solid manure or separately. Most of the manurial residues from the eaten fodder collect in the liquid rather than in the solid manure, and a good effective manure pit is always worth while.

Implement-Shed.

An implement-shed is a building that can be recommended. A roof and supporting posts are practically all that is required. The main point which should distinguish the design of an implement-shed is a comparatively small number of supporting posts so that any particular implement can be got in or out without having to make too general a re-shuffle. The fewness of the posts requires the few used to be heavy, and the longer span also necessitates extra heavy top plates.

Silo.

No dairy-farm is quite complete without a silo. The chief points to remember in designing a silo are:—

1. It must be circular. This facilitates settling and gives suitable strength for a given outlay.
2. It must have height. I like to see a silo a full 30 feet high, and more is better.
3. It must have a smooth and perfectly vertical internal wall-surface. This facilitates settling and obviates harmful air pockets.
4. It must be as airtight as possible. The whole principle depends on effective exclusion of air.

Either brick or concrete makes an excellent material for construction, and the continuous internal chute from top to bottom should be adopted.

SHEEP DIPPING.

PRECAUTIONS THAT MUST BE TAKEN.

Requirements of Sheep Dipping Act.

By R. N. Johnstone, Senior Veterinary Officer.

The wool-growing industry of Australia is responsible for £63,000,000 out of a total of £100,000,000 received annually for exports of primary products from this country. It must the realized, then, that anything which interferes with this very important source of income is of real concern to all of us.

Sheep, like most other animals, are liable to become infested with ticks and lice, and the irritation caused by these parasites makes them scratch and bite their wool, or rub themselves against any convenient object, such as logs and fences, in order to alleviate that itchy feeling. In this way the wool is damaged and its value lowered.

The source of infestation by these parasites is always through contact with sheep which are already infested, in sale-yards or on roads, or, in the case of ticks, by being placed in yards or paddocks where tick-infested sheep have been.

The damage caused to the wool through these parasites varies in accordance with the degree of infestation. In some cases the depreciation may be only a penny in the pound, in others the loss is up to sixpence in the pound. Taking the lower figure, it can be estimated that, if all sheep in Victoria became infested, the annual loss would be £580,000. The great majority of sheep-owners realize this danger, and take steps to rid their flocks of parasites by dipping the sheep after shearing each year. But there is a small proportion of owners who, either through carelessness or lack of facilities for dipping, neglect this necessary precaution, and their sheep become badly infested.

If these owners keep their sheep wholly on their own properties, and in such a way as not to infest sheep on neighbouring holdings, the loss caused really concerns themselves only, but, if their sheep are driven or allowed to stray on roads, or are placed in sale-yards where they may come in contact with many other lots of sheep, it becomes a matter of general concern. Obviously the control of such a matter can be effected only by a Government body.

In order to assist those owners who wish to keep their sheep free from skin parasites the Sheep Dipping Act was passed by the Government, and its administration placed in the hands of the Chief Inspector of Stock. The Chief Inspector administers so many Acts that he must of necessity delegate some of his duties, and, amongst others, the duties imposed by this particular Act have been delegated to the writer.

During the past six months I have endeavoured to tighten up the administration of the Act. Naturally, in work of this sort, improvement can be effected only gradually. Ample warning must be given, and with this end in view inspectors under the Sheep Dipping Act have reported breaches of the provisions of the Act which have come under their notice.

During the current year 500 reports of offences under the Act have been received. In nearly 100 cases the offence was of such a nature

that prosecution was considered necessary. Naturally, a prosecution is the best form of local publicity. If a sheep-owner is fined at the local court for having infested sheep in the sale-yards or on the roads, every sheep-owner within 20 miles hears of it, and begins to wonder whether or not his own sheep have any lice or ticks on them; of course, in the owner's eyes, sheep are never badly infested—and precautions are taken to avoid being dragged into the public gaze for a simliar offence.

In the majority of cases reported, however, a letter of warning to the owner was considered sufficient to meet the case, but sheep-owners generally should take warning that, during the coming season, offences under this Act will be viewed much more seriously.

The Sheep Dipping Act provides that every sheep-owner shall dip all his sheep immediately after shearing, and directly from the shearing board, in every year, and shall, also, at the same time dip all his lambs. Lice and ticks are extremely partial to lamb, and if the lambs are not dipped at the same time as the rest of the flock, the pests are carried over by them and the effect of dipping is lost.

For several reasons many owners do not consider it advisable to dip their sheep immediately after shearing, the commonest reason being that there is not sufficient wool to retain the dip and the effect of dipping is lost much earlier. In these cases the Act provides that the sheep and lambs shall be kept in a securely fenced paddock, and shall be dipped within 60 days after the sheep have been shorn.

Every sheep-owner must satisfy any inspector under the Act that all his sheep and lambs have been dipped, and he must also, within one month of dipping, furnish a return to the Chief Inspector of Stock on a prescribed form, which may be obtained from any Dairy Supervisor or Inspector of Stock, or on application to the Chief Inspector of Stock.

Under the Act owners are required also to shear all their sheep each year. Failure to comply with any of these provisions renders them liable to penalties varying from £1 to £20.

Inspectors under the Act are empowered to enter any place for the purpose of inspecting sheep, to compel owners to muster sheep for inspection, and, except between 1st April and 31st October, to dip sheep. In such cases all costs of mustering, dipping, or droving must be borne by the owner.

It is also an offence under the Act to drive, or allow sheep infested with ticks or lice to stray, on a public road. Sheep unable to travel must not be abandoned, but be placed in a conveyance and carried, or else destroyed. Sheep carrying ticks or lice must not be exposed in a sale-yard, or on any place where sheep and lambs are offered for sale. Penalties for these offences varying from £1 to £10 are provided. The person responsible in each case is the owner, but in the case of travelling sheep the drover may be prosecuted and fined, or, if the owner of any property is absent from Victoria, his manager or any other person in charge of his sheep shall be deemed the owner, and shall be liable to the penalties prescribed.

"Dip" or "Dipped" means thoroughly immersed in some effective preparation for the destruction of ticks and lice. The Act does not attempt to prescribe what dip shall be used; all that it asks is that the dip shall be effective, and the onus of proof is thrown on the owner. If sheep are found infested with ticks or lice, the fact that they may have been dipped does not relieve the owner from responsibility.

Sheep Ticks and Lice.

A few words about ticks and lice may not be out of place.

The sheep louse is a great curse to the sheep industry and one that seems to be increasing rapidly. Curiously enough, many owners do not seem to consider lice to be so great a menace as ticks, although, as a matter of fact, the louse is by far the more serious of the two pests.

Fortunately the trouble can be prevented without great difficulty, for careful attention to dipping will completely rid sheep of lice. The species which infests Australian flocks is the biting louse. This lives in the wool, close to the skin, and when feeding, bites through the skin, causing intolerable irritation, which results in a serious loss of condition in the sheep. As a consequence, the wool becomes thin and poor. The louse is extremely active, and is endowed with marvellous fecundity and tenacity of life. The insect never leaves its host, unless it can transfer itself by contact to a fresh victim. This it does with great rapidity. Its eggs hatch within five to seven days after they have been deposited in the wool, and in about fourteen days from the time of hatching the louse is fully developed and capable of propagating its species at an alarming rate.

The little pests are very small and hard to see, being only about 1-30th of an inch long, and greyish-pink in colour. The most likely spot to look for them is just about the front of the shoulder-blade and on the side of the neck. It is useless to look for them on the wool fibre—only eggs will be seen there. If the wool of a lousy sheep be opened wide, with the direct sunlight on it, lice will be found right on the skin.

The sheep tick is, strictly speaking, not a true tick. It belongs to a family of two-winged flies. Its presence is usually indicated by the sheep rubbing against objects or nibbling their sides to obtain relief from the irritation set up by them.

So far as is known at present, the only host of this tick is the sheep, but it will live a considerable time away from its host and, because of this, a clean flock is liable to become infested without actually coming in contact with tick-infested sheep.

The tick feeds by inserting its proboscis into the hair-follicle, or the duct of a sweat gland, and the minute teeth on the tip of the proboscis scarify the deeper and softer skin tissue of the host, provoking a flow of blood which is then sucked up.

Dipping, in a reliable dip, is the best remedy to adopt for both lice and ticks, but the job must be done thoroughly. It should be borne in mind that unfavorable conditions, such as heavy rain soon after the operation, may wash out much of the dip and thus militate against complete success.

In the case of sheep badly infested with lice, it is advisable to re-dip them within fourteen days in order to destroy any lice which may have been hatched out after the first dipping.

Sheep dips consist of arsenical and cresylic acid preparations, and each class has its advantages. The practical value of dipping depends not merely on killing the insects that are alive at dipping, but on the length of the period during which it protects the sheep from reinfestation. Dips vary individually in their lasting properties. One criterion for guidance is their relative solubility. If a dip is rapidly soluble it may be taken as probable that it is wanting in lasting effects. Sheep-owners, for their pocket's sake, prefer dips which mix slowly to those which dissolve quickly.

The essential point of the operation of dipping is absolute care and thoroughness. To mix the dip hastily, pass the sheep through the dip in a haphazard style, and dry them under any conditions is not proper dipping. It is making a farce of the job, and these methods explain the poor results frequently obtained.

It is desirable that each sheep-owner should construct a dip on his own property. Driving to and from a public or neighbour's dip is good neither for the sheep or the dipping. If a powder dip is being used, mixing is a most important matter. Measure accurately the quantities of powder and water, and see that both are properly combined. The time devoted to mixing will be well repaid; never guess the contents of a bath; on no account put dry powder into the dip; never use hard water with liquid dips; stir the dip thoroughly before putting the sheep into it; and do not put over-heated sheep into the dip. Care must be taken to thoroughly saturate the animal to the very skin. Check the sheep when swimming through by gently pushing them back once or twice; this opens the fleece and helps the dip to penetrate. Quietly push their heads under twice with a crutch, but do not hold them under. Drain the sheep thoroughly before allowing them on to pasture. Dry in the shade if possible; drying in the sun sometimes causes scalding, as will also heavy rain.

HANDLING AND MARKETING SOFT FRUITS.

By J. M. Ward, Superintendent of Horticulture.

The first steps in successful marketing of fruit are good grading and packing. This applies to peaches and other stone fruits equally as much as it does to apples and pears.

Competition in fruit selling is becoming keener every year, and the consuming public is continually demanding a better article. Yet growers have much to learn in regard to placing their produce on the market in really good condition and with an attractive appearance.

A matter which is often overlooked by the producer is the enormous loss due to bruising and other injuries, not only while the fruit is in transit, but even before the cases are nailed down in the orchard or packing shed. Many growers unconsciously handle their fruit in a rather rough manner.

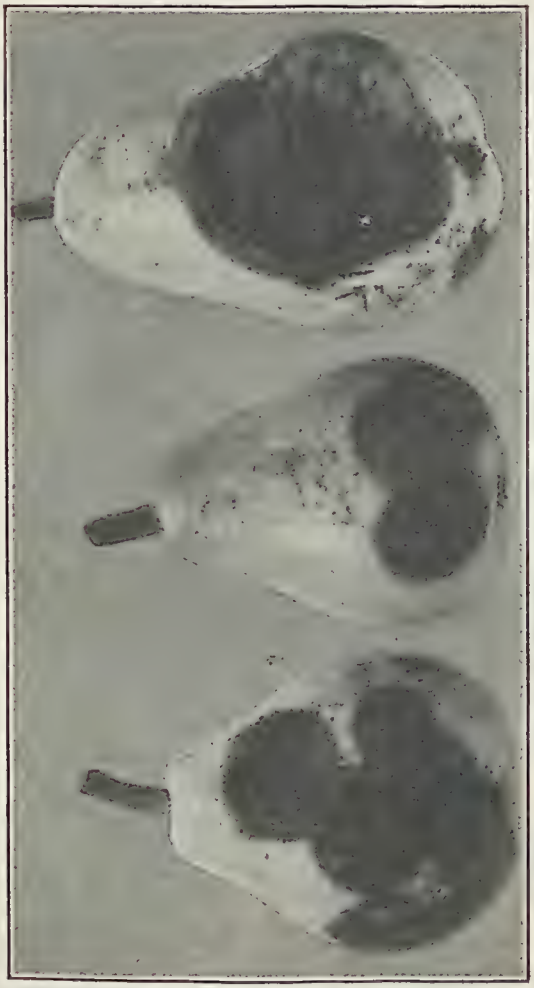
All fruit, particularly peaches, should be handled as carefully as eggs. If an egg is dropped, it will break, and thus cannot be marketed; if a peach is dropped, it will not break, but more often than not, however, it is equally as much damaged as the egg, though the injury does not become apparent for a few days.

To appreciate to the full extent the waste caused by bruised fruit, it would be necessary for a grower to follow his fruit from the orchard to the fresh fruit market. There he would see that a great deal of unnecessary freight, cartage, commission, and other charges are paid on fruit which, owing to injury, is of no commercial value—expenses which could be avoided by more skilful and careful handling.

To effect an improvement in the handling of our fruit, growers and others must first recognize that improved methods are essential. Until this lesson is learnt by all who have any part in picking or packing, the loss will continue.

Transit Rot.

Apart from the damage brought about by mechanical injury, growers of peaches are faced with loss due to transit rot (*Rhizopus nigricans*, Ehrbg). Thousands of cases of peaches and pears have been destroyed in recent years by this disease. In a leaflet on the subject, written a couple of years ago by Mr. C. C. Brittlebank, biologist, and Mr. D. B.



Pears showing Transit Soft Rot.

Fruit in this condition standing at normal summer temperatures may be completely broken down in two or three days.

Adam, B.Agr.Sc., pathologist, they say—"Many growers of canning peaches in the Goulburn Valley have suffered losses of good fruit from the ravages of a 'soft rot' affecting fruit during its despatch to metropolitan canneries. The cause of this rot is the fungus *Rhizopus nigricans*, Ehrbg. This fungus is not parasitic, at least not in the same sense that the 'brown rot' organism *Sclerotinia cinerea* is a parasite, since the former very rarely attacks fruit on the tree. It, however, develops with

extraordinary rapidity under transit conditions, where the warm moist conditions found in a truck are very favorable to its development. A case of fruit may leave the grower in sound condition, but before processing, 70 per cent. or more may have become worthless. Seeing that fruit is rarely affected before packing, and that the chances of each or any fruit carrying spores of this fungus are small, a method of control is indicated. This necessary method is summed up in a word—sanitation."

The following suggestions are made in the leaflet for lessening the liability of transit rot:—

"(1) Since cases for factory use are used over and over again, the first precaution necessary is to *sterilize all cases* before use. This may be effected by submerging them for from one to three minutes in water kept boiling by continuous steam injections.

(2) The shed-interior and all woodwork, lorries, &c., should be sprayed with bluestone (2 lb. to 40 gallons).

(3) Any scraps of old fruit lying about should be picked up and burnt: these pieces may be densely covered with black pin-head shaped spore-bodies, the spores of which, unless destroyed, would carry the disease on.

The above methods, pursued by a Valley grower last season, met with remarkably good results, a complete arrest of the disease having been effected. In fact, the grower estimated that had he applied the remedy at the beginning of the season he would have saved £1,300.

Finally, this fungus has an equally bad effect on apricots and pears, which either in the green or ripe state have the same susceptibility as peaches."

Although the foregoing advice means more work for the grower, he must remember that it is work which will ensure better financial returns. Any trouble taken over cleaning up the orchard or packing shed means increased profits.

The Necessity for Careful Grading.

A common complaint among purchasers of peaches is that ripe, partly ripe, and immature fruit is packed in the one case, with the result that, upon arrival at its destination, some of the fruits are overripe, whilst others are hard and green. The packer should exercise every care to grade his fruit to quality, maturity, and size standards. When shipping to the Sydney market, it may pay the grower to use corrugated cardboard—specially made for the purpose—on the sides, top, and bottom of the case; this will prevent damage to the fruit in transit.

A point to be observed in the packing of peaches is to see that the sature margin, or "lip," of the peach does not come in contact with the wood of the case. This "lip" is the most tender part of the fruit, and therefore the most easily damaged.

Practical instruction in fruit packing is given by two departmental packing instructors, who devote the whole of their time to the work. Their services are available to growers in every fruit district in Victoria. Illustrated charts, showing how certain varieties of fruit can be correctly packed, are obtainable free of charge from the Department of Agriculture.

In conclusion, it should be remembered that Proper Packing Pays, and Standardization Simplifies Selling.

THE POULTRY INDUSTRY.

THE NECESSITY FOR INCREASED CONSUMPTION OF EGGS.

By W. C. Ragg, Chief Poultry Expert.

The Value of Eggs as Food.

In recent years publicity and advertising have been invoked to promote the consumption of many particular foods. We are daily confronted with posters and placards advising us to eat more fruit, drink more milk, and eat more honey. Many thousands of pounds are spent annually in telling of the wonderful benefits to be derived from some particular breakfast foods, &c. In fact, we are never without an advertising campaign urging a greater consumption of some kind of food. This week perhaps it is some form of cereal; next week maybe dried fruits will be extolled for their health-giving value.

Now all these foods are good, and the people interested in them are to be commended for bringing them so prominently under the notice of the consumers. But what of the poultrymen and egg producers in particular. They seem to have entered into a conspiracy of silence and promised not to tell the consumers of the important and nourishing qualities of eggs. Next to milk, the egg is probably the best concentrated food for both the young and the old, the healthy and the sick. They are so good because they contain all the elements of life, for when a fertile egg is incubated for 21 days a chicken hatches, so it must contain everything that is needed to make up the body of the chicken—blood, bone, tissue and flesh.

The white of the egg is one-tenth albumen and the rest mostly water. The yolk is by far the most nourishing part, nearly one-third of it consisting of fat in a very digestible form. Eggs contain lime, phosphorous, and iron. All medical men know that eggs are rich in the vitamine D, and also contain vitamines A and B as well. Everyone needs vitamine D to assist the body to work normally, and where it is lacking in the food of children they are likely to suffer from rickets.

The chemical composition of vitamines has not been determined as yet, but it is known that the principal sources of vitamine D are the ultra-violet rays in sunshine, cod liver oil, and yolks of eggs.

Unfortunately, a great number of people, especially workers in offices and factories, cannot spend sufficient time in the sunshine. For such cod liver oil would be an excellent food, but to most people it is very unpalatable. There are few, however, to whom eggs cannot be made appetising.

The great majority of consumers are unaware of the importance of vitamine D in body building and its wonderful health-giving properties. There is little waste in the digestion of an egg, and it is almost entirely absorbed by the body, and there are few foods that will so quickly repair wastage in the human body as new-laid eggs.

I read an article some time ago by Dr. Bundesen, of Chicago, in which he stated "Vitamines are to the food what nails are to a board in building a house. If you feed a child calcium and do not give him enought vitamine D, he will get rickets. If you do not nail the boards together your house will get rickety."

How the Industry can be Strengthened.

It is only because eggs are almost indispensable to the housewife that this unorganized and unadvertised industry is as important as it is to-day. A campaign to increase the consumption of eggs will not only benefit the poultry industry, but will improve the health of the people generally.

If some effort is not soon made to bring the good qualities of eggs more prominently under the notice of consumers, poultrymen will find that the consumption *per capita* will decrease, and this, I am afraid, would mean disaster to many who are embarking in the industry. The production of eggs is increasing rapidly. Apart from the increase on general farms, many new poultry farms are being built, and several of the old established ones building additions to increase their hatching and carrying capacity, which means that more and more eggs are going to be produced.

It is now almost certain that, compared with last year, only about half the number of eggs will be exported this year; so with less export and greater production it is possible that speculators who are reckoning on high prices for their cool store eggs in May and June next, may be disappointed.

Commercial men have found from experience that a mass attack through repetition of one idea, in news items, posters, and exhibits is an effective method to follow in inducing a large number of consumers to buy an article. Now all the men engaged in the egg business are in a wonderful position to launch a campaign to increase the consumption of eggs for the following reasons. First, because they are producing a good pure article of food, unadulterated and one that it is not possible to adulterate. Secondly, it is next only to milk as a nourishing concentrated food that can be recommended for young children as well as adults, and thirdly, it is an article almost indispensable to the average housewife, and all that is needed is a little extra " push " and advice as to how eggs can be prepared in new and attractive ways to bring about an increased demand.

What even a small increase in consumption would mean to the poultrymen can quickly be realized. The population of Victoria is approximately 1,700,000, and if by a publicity campaign half of these people could be induced to eat one egg a fortnight more than is now the case, the consumption would be increased by well over 20,000,000 eggs in a year, which at an average price of 1s. 6d. per dozen, would mean that the industry would gain over £128,000 per annum in hard cash.

In the last twelve months I have travelled to nearly every part of Victoria from Port Phillip to the Murray and from Eastern Gippsland to the South Australian border, and I claim I am probably in as good a position as any man to know the wonderful increase that is taking place in the production of eggs. I can assure poultrymen that the time has come when they must fight to keep their place in the tremendous competition amongst food industries. They must take steps to increase the outlets for their products, or else they will find their industry declining and will have to ask the Government for help to keep it alive.

Until recently it was the custom of a number of people to speak of the poultry industry with a sneer. Yet, after many years spent amongst poultrymen, I am of the opinion that to be a successful poultry-farmer, a man or woman must have more intelligence, initiative, and

pluck than is required to succeed in quite a number of other occupations. It is necessary for a poultry-farmer to know a good deal about building, carpentering, plumbing; he must have a knowledge of the laws that govern breeding, and he must also know something about foods and correct methods of feeding, the growing of green foods, and planning for continuous supplies throughout the year, to say nothing of an acquaintance with poultry diseases and their prevention. In addition, he must have the business intelligence to buy foods at the right time and in the right quantities, and know how to market his products to the best advantage.

The fact that on many poultry-farms the cost of feed amounts to thousands of pounds per annum, and that the value of the produce runs into five figures, is sufficient to show that poultry-farming should be undertaken only by the man or woman who has grit, determination, and intelligence, for until they have had several years of experience they will have a very hard row to hoe.

Times are changing. This once despised industry has grown from being almost the unwanted, feeble step-child of agriculture into a healthy youngster, and is now fourth on the list of Victoria's primary products, being preceded only by dairying, wool, and wheat. But it will not remain fourth unless the men engaged in the industry get together and stimulate the consumption of their products.

Dr. Bundesen recently gave the American poultrymen the following advice, and it can be followed by our poultrymen here:—

"Popularize the egg; educate the public about its importance in the diet, so that when the unintelligent groceryman tells Mrs. Housewife, as he does at some seasons of the year, that eggs are 3s. a dozen, she will not turn her attention to some other food that on the surface appears to be less expensive, but will insist that eggs are necessary, and know that since they promote health, they will be less expensive in the end. Another factor one must not forget in this age of slender lines and worry about how to reduce that over-plump figure, is that eggs are not fattening; tell that to the women of America and they will thank you for it.

"This is an age of advertising. If you are going to be heard above the cry of others, you must call louder than they. Believe in your product, have faith in it, and then tell the public about it."

He goes on further to say—"An egg a day increases the baby's weight, keeps brother strong, paints a glow on sister's cheeks and lips, keeps mother young, and helps father to bring home the bacon. And this is no eggs-aggeration."

POTATO AND ONION PESTS.

By S. G. Harris, Senior Potato Inspector.

I have been preaching for about fifteen years the necessity for spraying potato crops, and must confess that so far my efforts have not been crowned with very gratifying success with respect to the number of practical converts. Demonstrations given by the Department have been such as to convince growers of the efficacy of spraying, but the lack of a water supply has frequently been a stumbling block.

The machines used by the Department are of the standard type and will spray five rows at a time, and distribute about 80 gallons of solution to the acre. If a water supply be handy and one man can give his whole attention to mixing and another to driving, an area of from 10 to 12 acres per day can be sprayed. This would mean a requirement of from 800 to 1,000 gallons of water. If, therefore, it is intended to make systematic spraying part of the farm work, water storage will have to be provided, as is done by orchardists. Where an underground supply is available a windmill is all the provision necessary, and the filling of the barrel on the machine is expedited by having a pipe supply high enough for the machine to pass under. I am confident that if any grower took up the matter of spraying his crop systematically over a period of, say, three years, he would never return to the present haphazard, trust-to-luck system—or rather lack of system.

Cut Worms.

Mr. French, Government Entomologist, advises me that specimens of plants that have been attacked by cut worms are being received by him almost daily, and there is every indication that these worms will develop into a positive plague this season. The following extracts are from a pamphlet prepared some years since by Mr. French, and issued free:—

"Cut worms are also known as cut worm caterpillars, looper caterpillars, army worms, take-all grubs, &c. They are variable in colour, especially the larvæ of the tomato moth. The latter vary from green to yellowish, but most of the agrotis are of a dirty greyish or light brown colour, without hairs or spines, smooth, and greasy looking, often being of a similar colour to the ground in which they hibernate. Some of the cut worms feed both day and night, whilst others hibernate just under the soil, or under logs, stones, bags, bark, and rubbish, during the day, and feed during the night. When they are fully grown (which takes a couple of weeks) they pupate, the pupa being of a dirty reddish brown colour, sometimes almost black. After pupating, they remain in the ground, in warm weather from ten to fifteen days before the moths emerge; in cold weather the period is much longer. The caterpillars are often found in pastures, particularly if the winter has been a mild one. Their depredations consist, not only of eating pasture grasses, but also garden plants."

Life History.

In his pamphlet, Mr. French says:—

"There are at least three broods of cut worm moths in a season, but further observation will be necessary before the number is finally ascertained. The moths usually fly about at dusk, and deposit their eggs on any suitable plant. They are nocturnal flyers, and during the day remain concealed under logs, stones, grass, &c. The female moths deposit their eggs on stones, grass, leaves, &c., in almost any locality where the ground is well covered with vegetation, so that the young caterpillars can easily find food. The eggs hatch in a few days, and the young cut worms start to feed at once, any kind of green food being greedily eaten by them. Even when the grain is just sprouting it is attacked, and often they will eat right into the husk. When the caterpillars have become fully grown, most of them descend into the soil, others pupate under stones, bags, logs, rubbish, &c. Mr. T. Bainbridge Fletcher, Government Entomologist, Madras, India, who has written several interesting articles on cut worm caterpillar pests, states as follows:—'As each female moth may lay anything between 100 and 500 eggs, and as the whole life cycle may be passed through in a month or little more, it will readily be seen that the destruction of a single member of the first brood means the destruction of thousands of its potential progeny; assuming, for the sake of example, that each female moth lays 300 eggs (a modest average), then in the second generation (November) we shall have 45,000 caterpillars producing 22,500 female moths, which are the parents of 6,750,000 caterpilars in the third generation (December). The assumption is, of course, that every individual survives, and no allowance has been made for reduction by parasites, enemies, or diseases; but, on the other hand, a comparatively low rate of increase has been selected (only about 60 per cent. of the possible), so that the figures given above are perhaps not so very wide of the mark after all.'"

If in the period of two months the progeny of one female moth is 6,750,000 caterpillars, one can readily understand how necessary it is to apply preventive measures as soon as the moth or grub makes its appearance. Two remedies are recommended by Mr. French—Paris green and arsenic. The way suggested for the use of Paris green is as follows:—"Place between rows of an infested crop, at short distances apart, bundles of any succulent weed or vegetable which have been previously poisoned by dipping into a strong mixture of Paris green, 1 oz. to a bucket of water. The cut worms eat the poisoned plants, bury themselves, and die. In hot, dry weather the bundles should be put out after sundown. Correspondents have frequently inquired whether there is any likelihood of vegetables absorbing Paris green from the mash when placed near the roots. I am assured by the Chemist for Agriculture that there is no danger, as the Paris green is practically insoluble, and, therefore, cannot be absorbed by the various plants."

"The arsenic can be used in a bran mash. The best proportion to use is one part by weight of arsenic, one of sugar, and six of bran, to which is added sufficient water to make a wet mash. This mixture is usually made in a wash tub or half barrel. One of these is filled three-fourthsful with dry bran, and to this is added about 5 lb. of

arsenic, which is thoroughly stirred through the bran with a spade or shovel; 5 lb. of sugar are next thrown into a pail, which is then filled with water, and the sugar stirred until it is dissolved, when the sugar water is added to the bran and arsenic, and the three well stirred. More water is added and the stirring continued until every portion of the mash becomes thoroughly saturated. The mixture should be placed around and through the crop, or at the foot of the tree, plant, or shrub infested, dropping it into the shade when this can be done. Both of these preparations should be kept out of the way of children and domestic animals."

The rapid means of reproduction accounts for the appearance of cut worms in some seasons in myriads, when they sweep across large areas and destroy almost everything in the way of crops in their path. When they appear in this form a very effective method of eradication is the trench. A trench or furrow should be either ploughed or dug around the crop towards which the cut worms are feeding. It must have clear cut sides; those nearest the crop should be undercut so as to prevent the cut worms from crawling out of the trench. Deep holes should be made in the trench at intervals of, say, five yards. When travelling towards the crop the cut worms fall into and crawl along the trench, and ultimately into the holes. A few shovelfuls of earth, well rammed, will then speedily destroy them. Should the pest be already in the crop it will be necessary to run a few furrows through it.

A Warning to Onion Growers.

Cut worms do not usually do a great deal of damage to potato crops, but they are very partial to onions, and onion growers will be well advised to keep a sharp look out this year for signs of their first attack and immediately take steps to eradicate them. For this purpose I would strongly recommend the bran mash treatment. The ingredients are easily obtainable, are simple to handle, and the preparation is undoubtedly effective.

The Light Brown Apple Moth.

Another pest to which I wish particularly to refer, and which is likely to do considerable damage this year, is the light brown apple moth caterpillar.

Although called an apple moth, this caterpillar will destroy all kinds of vegetables, and early this month a telephone message was received from Fish Creek stating that at least on one farm it was causing considerable damage to the potato crops. The larva of this moth is a green caterpillar usually about half an inch in length. It is very active, and when disturbed drops immediately to the ground. When ready to pupate it spins a web-like cocoon in the leaves of the potato or other plant attacked. Like most similar pests, the life history of the moth is very short, and they are very prolific; there will be at least four broods during the season.

Those appearing now are probably the larvæ of the first moths of the season, and to prevent any further spread of the pest immediate preventive measures should be taken. The best means of dealing with it is by spraying with the ordinary arsenate of lead solution, i.e., 1 lb.

of arsenate of lead to 25 gallons of water. Arsenate of lead can be purchased from any of the wholesale chemists at from about 1s. to 1s. 3d. per lb., and with a standard potato spraying machine the cost of spraying would be about 4s. to 5s. per acre.

The pamphlet on Cut Worms, from which I have so freely quoted, is obtainable free of charge from the Department of Agriculture, as is another pamphlet by Mr. French, entitled "Insect Pests of the Potato."

FEEDING TESTS ON DAIRY COWS IN AMERICA.

To determine the effect of succulent feeds on the flavour and odour of milk, and to ascertain the best methods for feeding such crops, the Department of Agriculture, United States of America, has announced the results of a series of tests conducted at one of its experimental farms. In a statement issued on 3rd August, the Department says it used selected cows, whose milk was relatively free from abnormal flavours and odours after being fed on a hay and grain ration. The full text of the statement is as follows:—

To determine whether dried beet pulp, green oats and peas, pumpkins, carrots, sugar beets, rape, soybeans, and kale when fed to dairy cows impart undesirable flavours and odours to the milk, and to ascertain the best methods of feeding such crops and handling the milk, the United States Department of Agriculture has conducted feeding tests at its experiment farm at Beltsville, Md.

The cows selected for the investigations were giving milk relatively free from abnormal flavours and odours when fed a basic hay and grain ration, and varied in stage of lactation from those fresh to those nearing end of lactation period.

Besides the succulent feed the animals received, in proportion to milk produced, varying quantities of the following grain mixture:— 100 lb. each of hominy feed, bran, and oats, and 50 lb. each cotton-seed meal and linseed-oil meal. In addition they were given all the alfalfa hay they would readily consume. The cows were divided into groups of four each, and interchanged at intervals of four days.

Dried beet pulp soaked and fed wet one hour before milking in quantities up to 30 lb. produced but a slightly abnormal flavour and odour in the milk. The same ration immediately after milking had no effect on its flavour or odour. Similar results followed the feeding of a like quantity of green oats and peas one hour before and after milking. Both kale and rape fed in similar quantities one hour prior to milking produced a decidedly abnormal flavour and odour in the milk, but had a negligible effect when fed afterward. Soybeans fed one hour before milking tended to improve the flavour and odour of the milk.

THE HOUSE FLY.

By G. T. Levick, B.Ag.Sc.

With the advent of warmer weather, we are once again troubled with a number of household insects to which, during the winter months, we probably have not given a thought. Amongst these are three typical Diptera, or two-winged insects, namely the mosquitoes, the blow-flies, and the house flies, and it is with the latter that this article will deal.

The term "House Flies," in its restriected sense applies only to the insect *Musca domestica*, but common usage applies it also to a number of small two-winged flies, superficially similar in appearance, which frequent human habitations. Of these the true house fly is by far the most numerous and widespread, and as the other flies have somewhat similar habits, there is little necessity for differentiating between them. Those interested in public health frequently refer to the house fly as the "Typhoid Fly" or the "Filth Fly" with the object of impressing on the public the fact that this insect is a very real menace to health.

The house fly is without doubt responsible for more disease and suffering in civilized communities than any other insect, yet, on account of its very commonness, it is popularly regarded as more or less harmless, though irritating, and as being as inevitable as the summer itself. As a matter of fact, it serves as a mechanical agent in the dissemination of all kinds of infectious material, and is thus responsible for the spread of many intestinal diseases, such as typhoid fever, cholera, dysentery, and summer diarrhoea in infants, while there is little doubt that tuberculosis, small pox, parasitic worms and many other diseases are spread by flies.

The manner in which these diseases are carried is quite different from the way in which the mosquitoes and other skin-piercing insects spread infection. The house fly has no organ capable of piercing the human skin, and so cannot transfer organisms directly from one person to another. Its method, however, is just as deadly and nearly as certain. It has a liking, on the one hand, for substances used by man for food, and on the other, for excremental products, purulent discharges and moist surfaces. Should these latter contain pathogenic organisms, they will be conveyed entangled in the hairs with which its legs and body are covered, to foodstuffs and thus to the alimentary tract of man, or, in other cases, directly to moist places such as the eyes and nose of man himself. The habit of the fly of living on human filth and excrement, and finding its way indoors to deposit vomit spots and faecal droppings reeking with bacteria on foodstuffs and utensils should be sufficient to indicate the danger of allowing the house fly to multiply unchecked.

Life History.

The house fly lays its eggs in several batches, each consisting of about 150, in horse manure for preference, though it breeds freely in human excreta, fowl manure, rotting garbage, and almost any accumulation of rotting and fermenting vegetable matter. The eggs are small, long, ovate, cream-coloured bodies, about one-twentieth of an inch in

length. They are laid in crevices in the manure, &c., and are thus rarely seen, though, as more than one fly usually lays in the same place, they occur in enormous numbers. The eggs hatch in less than a day in the summer time to small transparent legless maggots, which feed voraciously on the material surrounding them. These maggots or larva grow rapidly, and under favorable conditions may become full grown in from three to four days, though the larval period may be greatly prolonged owing to adverse conditions, such as cold weather, unsuitable food, &c.

When full grown, the maggots migrate to the bottom and towards the edge of the manure heap or pile of organic matter, and this tendency is made use of in an ingenious maggot-trap, which will be described later. If the ground is soft the larva will bury itself sometimes as deeply as 29 inches, before pupating in a hard brown roughly barrel-shaped pupa case or puparium.

In this pupa or resting stage they must remain from 4 or 5 days in the summer to as many months during the winter time. The fully-developed adult fly then emerges through a circular split in the head end of the pupa case, and works its way to the surface. In a few days the female is capable of laying eggs.

A question often asked is "Where do the flies go in the winter time?" Some appear to live throughout the winter months in the adult stage, particularly in sheltered spots indoors, but the huge majority die with the cold weather, or are destroyed by the fungus disease, *Empusa muscae*, which attacks them in the autumn. Flies may often be seen on warm autumn days sunning themselves on a sheltered wall, but they are very sluggish and fall an easy prey to their enemies.

While the adults die, the larval and pupal stages (their development retarded by the cold weather) await the warm days of the following spring to complete their metamorphisis, and a very short period of warmth is sufficient to bring forth a fresh generation of the pests. With such rapidity do they appear that it almost seems that the flies have simply been in hiding ready to venture out with the first warm days. Doubtless in this climate, a certain amount of breeding takes place in sheltered spots throughout the year.

Methods of Eradication.

(*a*) Preventative Measures.

While the preventative measures are always acknowledged as being far in advance of remedial methods it is often assumed that they are of little value unless widely adopted. This is, however, not altogether the case. Though flies may travel long distances (up to ten miles or more) the majority will always be found where foodstuffs and breeding places are readily available, hence it is of greatest benefit to each individual to keep his premises free from all refuse which may be attractive to flies. All household garbage should be enclosed in a fly-proof container, kept in a clean odourless condition and emptied frequently. Fowl runs must be kept clean, no accumulations of droppings being allowed. When manure is obtained for garden purposes, it should be used at once and not be allowed to become a breeding place for flies. The attention of the Government Entomologist has been directed frequently to fly plagues which have emanated from heaps of manure waiting to be used in the garden.

Where horses are kept, the manure should be removed at least twice a week during the summer, before the fly larvae have time to pupate in the soil beneath. The stables and their surroundings should be kept scrupulously clean, as the flies breed in suprising numbers from quite small accumulations of manure. Where there are dairies and places in which foodstuffs are handled, manure should be removed daily and spread thinly over the fields so that is may dry rapidly and thus become unsuitable as a breeding place for flies. Twice a week would hardly be sufficient, as if the maggots reach any size before the manure is scattered, they may complete their development under such conditions.

The treatment of manure heaps with chemicals has been investigated, but seems more expensive and troublesome than frequent removals. Of these chemicals, borax is perhaps the most efficient. It is used at the rate of 1 lb. in 14 gallons of water, sprinkled over each 10 cubic feet of manure. Too much borax is apt to have an injurious effect on plant growth, and therefore should be used with discretion. Chloride of lime is also used sprinkled over manure-heaps to keep down offensive odours and thus act as a deterrent to flies.

A maggot trap has been devised in America which depends on the habit of the full grown larva or maggot migrating downwards from the manure heap for the purpose of pupating. This consists essentially of a manure heap constructed on a slatted platform instead of on the ground. The maggots, when full grown, migrate downwards, pass between the slats, and fall into a concrete basin below, which is kept full of water in which they drown. The trap acts best when the manure heap is kept thoroughly moistened, and it is advisable to apply a small quantity of water each morning after the stable cleanings have been added to the pile. A strong wire mesh may be employed in place of slats for the bottom of the pile.

(*b*) Remedial Measures.

Once the flies are about, every effort should be made to keep them out of the house. This is done by the careful screening of all doors and windows with fly-wire. A useful precaution often neglected is to cover the ventilators and chimney-tops with fly-wire, as flies, especially blow-flies, will frequently enter by these places. As an additional precaution, all food, especially milk, should also be kept covered. In the hot weather, much can be done by keeping the house darkened during the day-time by the judicious use of blinds. This serves the double purpose of making the rooms cool and rendering them less attractive to flies While this plan may be rather impracticable in the case of kitchens, &c., it is well worth while for the remainder of the house.

When the flies are in the house there are several means which may be employed to get rid of them. These may be divided into the following methods, viz., fly-papers, fly poisons, and contact insecticides. Fly-papers are rather objectionable inasmuch as they are unsightly and rather messy, but have the advantage of working continuously and needing little attention. They are most useful in the kitchen, pantries, &c. Fly papers are generally bought ready made, but may be easily and cheaply prepared at home. A pound of resin is dissolved in a large cupful of castor oil, heated and stirred until a clear solution is obtained. This is spread thinly on stout paper or on spiral wire, &c., which is hung where required. Various poisons have been used for killing flies, the

commercial preparations being generally in the form of blotting paper steeped in a chemical, which is placed on a plate and moistened. When the flies suck up the moisture, they are poisoned. A good poison may be made by moistening blotting paper in a plate with sweetened milk, to which has been added three teaspoons of formalin to the pint. The formalin and milk will keep for a long time in a stoppered bottle, and a little is used as required.

The contact insecticides are all commercial preparations taking the form of either a dust or a liquid spray. The dusts are generally pyrethrum, and the liquids are extracts from the same substance. These are nearly all quite efficient when used according to directions. The powder insecticides seem to find their most useful application sprinkled round window frames in darkened rooms. The flies are attracted to the light from the windows, and become covered with dust, which kills them. The liquid is sprayed round the room, and as well as killing all the flies with which it comes in contact, makes the rooms unattractive to them.

TREATMENT OF WOOD BORERS.

By C. French, junr., Government Entomologist.

During the last few years, householders throughout Victoria have suffered very considerably from the depredations made upon valuable furniture by the insects know as "wood borers." Further, they often cause great damage to the beams and other wood-work used in the frames of houses, as well as in the floorings, producing the result known as "worm-eaten."

The external indications of the presence of these destructive insects are usually two-fold—small circular perforations in the surface of the wood, and little heaps of yellow dust on the ground beneath. The perforations are the entrances to, or rather exits from, long cylindrical tunnels traversing the timber in various directions, generally in that of its length, and they are often so numerous as to leave only the narrowest of partitions between the tunnels, and thus reduce the whole interior to a mere net-work, so fragile that it will crumble away on the slightest touch, though to outward appearances the wood seems perfectly sound, except for the few perforations. The beetles are not very often seen, as they spend a large proportion of their lives in their burrows, and like white ants, prefer to work in the dark.

The Powder Post Beetle (*Lyctus*).

During the course of their lives they undergo a change of form. First of all, there is the egg, secondly the larva, grub, or caterpillar, thirdly the chrylasis or pupa, and fourthly the perfect insect.

The chief timber-boring insect of the whole variety is the "Powder Post Beetle" (*Lyctus*). This small beetle, which is dark brown and sometimes almost black in colour, measures about one-sixth of an inch in length.

The female deposits her eggs on the underside of timber in the pores and ends. They hatch very quickly, and the larva or grubs at once commence to work into the wood. The beetles are easily detected, for they and their larvæ feed on the timber, and some of the sawdust, which is passed through them, can usually be seen collected in small heaps. It is not always possible to detect them before the damage is done, as sometimes they commence boring underneath the boards, joists, and other timbers of buildings, and thus their presence is not suspected until the timber begins to fall to pieces.

The perfect insects are found in the timber all the year round. Occasionally in hot weather they may be seen emerging in large numbers from wickerwork and rattan furniture and thence transferring their attention to any kind of timber that is handy. The backs of bookcases, cupboards, wardrobes, and the inside woodwork of pianos are particularly liable to attack, and ordinary table legs and wickerwork furniture seem to be among their favourite breeding places. Should they be noticed in numbers on the curtains and blinds of houses, it would be advisable, before they commence their boring operations, to have the whole place fumigated with hydrocyanic acid gas or bisulphide of carbon. When using these chemicals the services of an expert should, when possible, be obtained, as great care is required in using them.

The "Powder Post Beetle" first came under notice in the year 1862, and it is now to be found in most parts of the world. It was probably first introduced into Australia in wickerwork, rattan, or bamboo furniture or in tool handles or other timber. When it was found to be such a serious pest a rigid system of inspection of all timber imports was established, and it is strictly enforced.

Recently I visited a fine house where nearly every joist in the roof had been attacked by borers, and they had begun to tunnel the furniture in the dining and other rooms. This shows the advisability of having man-holes in the roofs of buildings, so that an examination of the roof supports may be made from time to time. In the house referred to the wood had been affected before it was used in the building, as the place had been erected only a little while. Many assertions have been made that the furniture beetles attack hardwoods only, but such is not the case. In fact, in the hardwood timbers affected by them which I have seen, the ravages have rarely gone beyond the sapwood, and if timber merchants see that the sapwood is removed, builders and others need have no fear in using these fine woods. In the case of hickory, cedar, New Zealand kauri, blackwood, ash, deal, oak, and numerous other woods, the borers certainly do not confine themselves to the sapwood only. Often when they attack old timber in houses, they reduce it to sawdust in a very short space of time. Firewood cut in the forest and left on the ground is often attacked by borers, and so becomes a medium by which the pests are brought within reach of houses and furniture.

The Furniture Borer *Anobium (domesticum) punctatum.*

Another insect which causes considerable damage to timber, &c., is the "Furniture Borer." It is scarcely one-sixth of an inch long and is of a dark brown colour. The adults of this class of wood-boring insects place their eggs on the wood.. The minute worms hatching from the eggs bore directly into the wood, forming at first holes so small that

they are scarcely visible to the naked eye. They do not stop in the sapwood, but extend their burrows to the very heart of the tree, each worm or grub making for itself a separate burrow, in which it remains until matured. The borings and excrements from the wood are pushed out from the original entrance as the borers move backwards and forwards, which they must frequently do, both to clear the burrows and to enlarge them to accommodate the increasing size of their bodies. Thus the holes are found to vary in size, and to extend several feet through the wood. No wood is so old and dry that they cannot extract nourishment from it; in fact, the older and drier it is, the better they like it. The tunnels made by the "Furniture Borer" are about twice the size of those made by the "Powder Post Beetle," and look as if they had been burnt out. The direct damage caused by actual excavation and devouring of wood-work out of doors is not the only injury for which they are responsible, for damp air enters the substance of the wood through the burrows, and meeting there the excrement stored in great quantities, the tunnels become good bases for the growth of fungi, whereby the decay is rapidly accelerated.

Prevention and Remedies against Borers.

I would suggest that timbers to be placed in buildings where they cannot be seen be treated with the Vacuum Creosoting process. This process impregnates the wood with creosote, and in experiments recently carried out excellent results have been obtained against white ant and borer infection. I am of opinion that the process will result in protecting the timber from subsequent infestations. When the sapwood is affected by Power Post Beetles, creosote and kerosene in equal parts will give good results. Two applications by painting or spraying at intervals of a week should be given. Turpentine, benzine, petrol, carbolic acid, and kerosene are also recommended, but the creosote and kerosene is the best. Where timber is so badly infested with "Furniture Borers" as to be valueless, it should be cut out and burned; such timber only provides the source of further infestations. If only slightly infested, use the same treatment as recommended for Powder Post Beetles. There are also on the market a number of reliable proprietary chemicals for borer destruction which have given good results, and particulars can be supplied on application.

In conclusion, I might say that at the present time there are unscrupulous people canvassing householders, generally scaring them and urging the treatment of their houses for borer. These people, I understand, are doing the work at an exorbitant rate. In every case, householders are invited to get in touch with the Department of Agriculture, and obtain an official report, before engaging any one to do the work.

SELF-FEEDER FOR SHEEP.

Details of Construction.

In a letter to the Sheep and Wool Expert (Mr. N. Bowman) Mr. A. H. Richardson, of Gorrinn station, Lobies, Victoria, gives a description of a self-feeder used with marked success for sheep on his property. Mr. Richardson points out that his idea in feeding his stud sheep all the year round is to build them up before lambing. At the same time this gives the lamb a better chance. He intends to keep on with the feed all through the lambing season and, after the lambs are weaned he will give them a feeder to themselves. All Show sheep will have to be taken out, but it is Mr. Richardson's intention to give up showing two-tooths so that he can feed them. The rams will not be fed after they have been shorn as two-tooths.

Self-Feeder used for Sheep at Gorrinn, Dobies, Victoria.

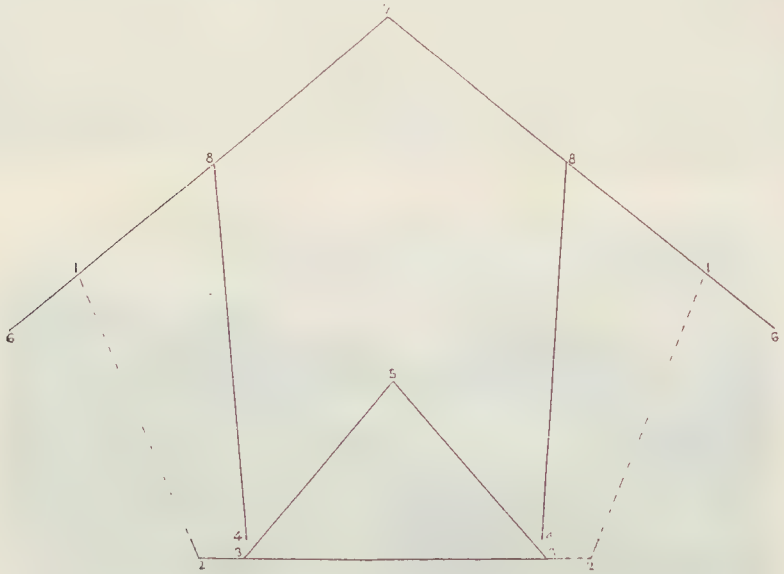
(The posts and battens are to prevent the feeder blowing over in strong winds.)

The feed Mr. Richardson is using now is a mixture of oats and chaff, in different proportions according to the state of the feed on the paddock. When he first put the feed out in about June to lambing stud ewes, they were eating nearly $\frac{3}{4}$ lb. a day; at the beginning of September they had just got down to work on $\frac{1}{4}$ lb. a day, and later when the other feed was at its top, they were eating practically nothing from the feeder.

Continuing, Mr. Richardson writes—"In using these feeders at lambing time we have not the slightest bother with the sheep or lambs. After the sheep get used to the feeder, they never all try at once to get at it, but just hang about till they can get in. They generally come to the feeder twice a day, about nine or ten o'clock in the morning and

about five or six o'clock in the evening. I had 267 ewes and lambs at one of these feeders with no bother.

"This feeder is not all expensive to make. All that it is made of is a frame of 3 inches x 2 inches hardwood covered with $\frac{1}{2}$ inch pine, plain iron for the centre V, and ordinary roofing iron for the roof. We had one made in Ararat to see what the cost would come out at, and it was £9 10s. That is the one in the photograph. As you will see, it is different from the one that I have shown on the plan. That on the plan is as we make them ourselves. This plan is a rough one, but it might help you to get the idea.



Cross-Section of Self-Feeder illustrated on page 675.

"We like to board the whole end up to the lines 1-2 on the plan, so as to keep the wind out of the trough. The centre V is made of 3 inches x 2 inches hardwood covered with flat iron, and comes just a little past the walls so as to run the feed well into the trough. The space 3-4 should be kept up $1\frac{3}{4}$ inches for chaff, and an inch for oats. As you can see by the photograph, there are two holes in the roof on each side to put the feed in. The feeder is made to hold 700 lb. of oats, and is 11 ft. long.

"It is too early to say anything about the result of this feeding just yet, as I have only carried it out for only four months. At next shearing we should know something.

EXPERIMENTS AT RUTHERGLEN.

FARMERS' FIELD DAY.

Several hundred farmers from districts in the north-east made an inspection of the experimental plots at the Sate Farm, Rutherglen, on Friday, 18th November, when officers of the Department, in conjunction with the Rutherglen Agricultural Society, conducted a field day there. Among those present were the Assistant Minister of Agriculture, Mr. Cain; the Superintendent of Agriculture, Mr. Mullett; Mr. Thomas, Inspector of Agriculture, and the manager of the farm, Mr. Miller.

In explaining the nature of the experiments, Mr. Mullett pointed out that the farm had been established in 1912 for the purpose of assisting the agricultural development of the north-eastern areas of the State. The area of the farm comprised 1,100 acres, of which 150 acres were laid out in experimental plots. The balance of the area was devoted to the production of pure seed wheat and oats, the maintenance of a Border Leicester stud, and general mixed farming.

CEREAL TESTS.

Variety Tests of Wheat and Oats.

These comprise four sections as follow:—

(*a*) *Single rows of crossbred and standard varieties* sown for stud purposes. Located in No. 1 field (permanent experimental section)

(*b*) *Variety Observation Plots.*

These plots are 1-100th acre in area, and each variety is sown alongside a check plot of a standard variety. The object of these plots is to observe the behaviour of new varieties under Rutherglen conditions. The produce of the plots is used to sow the larger variety tests. Each year seed for these plots is obtained from the State Research Farm, Werribee, so that uniformity of type of the various varieties grown by the Department may be maintained.

(*c*) *Variety Plots.*

Thirty wheat and twelve oat varieties are under test in plots each 1-10th acre in area, and each sown adjacent to a check plot of a standard variety. The yields are ascertained, and those varieties that warrant it are later compared in more accurate field trials.

Oats were sown on 14th May with 50 lb. seed and 154 lb. super. per acre; wheat on the 25th-27th May, with 66 lb. seed and 154 lb. super.

The following results, over the four-year period 1922-1925 inclusive, are of interest, as they include most of the varieties grown in the district:—

TABLE I.—VARIETY TRIALS, WHEAT.

Average Yields, Four Years, 1922-25.

Variety.	Yield per Acre.
	Bushels.
Free Gallipoli	28·6
Federation	26·5
Graham	24·9
Major	24·8
Omrah	24·0
Rajah	23·9
Dart's Imperial	23·3
Ranee	22·8
Wannon	22·6
Currawa	22·0

(*d*) *Replicated Yield Trials.*

After graduation in the foregoing plots, varieties considered true to type and worthy of exact test are compared by the most accurate method available (Beavan half-strip replicated system). Each variety is sown five times over, each time alongside a check plot of the standard variety. The varieties being tested this year are Federation, Free Gallipoli, Turvey, Currawa, Major, and Yandilla King. They were sown on 24th May, with 66 lb. seed and 140 lb. superphosphate per acre. These varieties have been chosen in order to ascertain the best of the principal varieties grown in the district. When this has been determined, all new varieties of promise will be compared in the same way. No wheat which has not successfully passed this test will be distributed as seed.

Permanent Rotation Tests.

The object is to determine the effect on soil fertility of various systems of farming. Eleven rotations, comprising 40 plots, are included in the tests, and in all of them wheat is the principal revenue-producing crop. In some cases the growing of forage crops on the fallow preceding the wheat is being tried. These are grazed by sheep, and a record kept of the grazing afforded, and of any gain or loss in live weight produced by each crop.

From such an experiment, in which in some instances the cycle is not completed under five years, quick results cannot be expected. Nevertheless, some striking differences in growth are to be observed in the field, and in some instances the yield of wheat has already been shown to have been affected by the rotation practised. Land that has been continuously cropped to wheat, for instance, has produced an average yield of only 6½ bushels, or about one-third of that obtained when the wheat crop has followed a bare-fallow. The substitution of a summer forage crop, Sudan grass, for the bare-fallow, has reduced the wheat yield by about

6 bushels per acre. However, one or two autumn forage crops, particularly peas, apparently can be grown alternately with wheat without the necessity of a bare-fallow preceding the latter crop. The yield of wheat is not reduced, but the advisability of practising such a course of cropping will depend on the economic use of the forage crop.

Where rye and vetches have been alternated with wheat, there has been a notable reduction in yield. In this case the reduction is partly due to the fact that take-all affects both crops in this rotation.

Manurial Trials, Wheat and Oats.

Twenty wheat and twenty oat plots are embraced in this section. The plots, 1-10 acre each, are sown on land alternately under crop and bare-fallow, and the site of each plot is permanent. In respect to all other factors, such as cultivation, seeding, &c., the plots are treated as uniformly as possible. This season oats were sown on 6th and 7th May, with 60 lb. seed, and wheat on 16th and 17th May, with 75 lb. seed per acre.

The results from this section, showing the average yields of wheat for twelve years, and of oats for four years, are set out in the following table:—

Table II.—Manurial Trials, Wheat and Oats.

Manure Applied per Acre.	Wheat—Average Yields for Twelve Years.	Oats—Average Yields for Twelve Years.
	Bushels per acre.	Bushels per acre.
Farmyard manure, 10 tons	20·5	37·6
Farmyard manure, 10 tons + lime, 10 cwt.	20·9	37·8
No manure	13·6	28·9
Super., ½ cwt.	19·4	41·5
Super., 2 cwt.	21·1	44·7
Super., 1 cwt.	20·6	44·9
Super., 1 cwt. + nitrate of soda, ½ cwt. (with seed)	23·0	46·0
Super., 1 cwt. + nitrate of soda, ½ cwt. (in spring)	21·6	47·2
Super., 1 cwt. + sulphate of ammonia, 44 lb.	21·8	49·0
Super., 1 cwt. + sulphate of ammonia, 44 lb. + sulphate of potash, ½ cwt.	20·1	46·6
No manure	12·6	29·7
Bonedust, 1 cwt.	19·5	43·4
Thomas phosphate, 1 cwt.	20·1	42·5
Thomas phosphate, ½ cwt. + super., ½ cwt.	20·9	49·4
Super., 1 cwt.	20·5	43·9
Super., 1 cwt. + lime, 5 cwt.	22·7	49·5
Super., 1 cwt. + lime, 10 cwt.	22·2	45·8
Super., 1 cwt. + lime, 20 cwt.	23·3	47·6
No manure	11·9	25·5
Super, 1 cwt. + sulphate of potash, ½ cwt.	20·1	46·3

It is evident from a perusal of these results that the application of superphosphate has given the most profitable results for both wheat and oats. The use of other manures, such as nitrate of soda, &c., in conjunction with superphosphate, apparently has given increases, but such

increases have not been sufficient to justify the additional expense incurred. The yields from plots treated with varying quantities of superphosphate indicate that it pays to apply at least 1 cwt. of super. with either wheat or oats sown on fallow. The following table shows the profit resulting from the use of the several dressings with wheat:—

TABLE III.—PROFIT DUE TO USE OF SUPERPHOSPHATE.

Manure applied per Acre.	Yield—Bushels per Acre.	Increase over No Manure. Bushels per Acre.	Value of Increase at 4s. 6d. per Bushel.	Cost of Manure at 6s. cwt.	Net Profit due to Use of Manure.
			s. d.	s. d.	s. d.
Wheat.					
No manure ..	13·6	..	..	..	..
Super., ½ cwt. ..	19·4	5·8	26 1	3 0	23 1
Super., 1 cwt. ..	20·6	7·0	31 6	6 0	25 6
Super., 2 cwt. ..	21·1	7·5	33 9	12 0	21 9
Oats.			at 2s. 6d. bus.		
No manure ..	28·9	..	..	..	..
Super., ½ cwt. ..	41·5	12·6	31 6	3 0	28 6
Super., 1 cwt. ..	44·9	16·0	40 0	6 0	34 0
Super., 2 cwt. ..	44·7	15·8	39 6	12 0	27 6

Cultivation Tests with Wheat.

These comprise twelve plots each 1-5th acre in area.

The object of the tests is to compare the yields of wheat sown on a series of plots tilled in various ways. A depth of ploughing test is included. Plots were sown on the 18th May, with 168 lb. super. and 74 lb. seed per acre.

The average yields of wheat from the plots for twelve years are as under:—

TABLE IV.—CULTIVATION TESTS, WHEAT.

Average Results for Twelve Years.

Treatment of Plot.	Yield per Acre.
	Bushels.
Ploughed 3 inches July, and well worked	19·0
Ploughed 5 inches July, and well worked	23·2
Ploughed 7 inches July, and well worked	24·9
Ploughed 9 inches July, and well worked	23·5
Ploughed 3 inches July, subsoiled, and well worked	21·6
Ploughed 5 inches July, subsoiled, and well worked	23·3
Ploughed 7 inches July, subsoiled, and well worked	24·1
Ploughed 5 inches July, and well worked	22·6
Ploughed 5 inches July, and neglected	13·3
Ploughed 5 inches October, and well worked	19·0
Ploughed 5 inches October, and neglected	17·3
Ploughed 5 inches just before seeding	9·3

It is apparent that shallow ploughing, practised so successfully in other wheat districts, is not advisable under the conditions at Rutherglen. The yields show an improvement as the depth of ploughing increases from 3 inches to 7 inches; beyond that depth, 9-in. ploughing, a decrease is evident. Subsoiling has had no appreciable influence on the yields, and the results are in agreement with those from the depth of ploughing section. Despite the subsoiling, the deeper ploughing still shows a beneficial influence on the crop. The yields from the early and late fallowed, cultivated and non-cultivated, and non-fallow plots, afford interesting comparisons, and unmistakably demonstrate the superiority of the early and well-worked fallow.

Green Manurial Tests.

The object of these tests is to ascertain the most economical method of restoring humus to worn-out soils. Forage crops are sown alternately with wheat in duplicate plots. Each year half the forages are ploughed under as green manure, and half are fed off to sheep, and later the residue incorporated in the soil. Barley, rape, peas, and rye and vetches are the forages being tested. There is also a series where oats is substituted for wheat as the grain crop.

The results indicate that the costly old-world practice of ploughing under the green crop is of no advantage as compared to the result obtained in the rotation where the same crop is fed off. Incidentally, the series shows the disadvantage of using barley and rye—take-all susceptible crops—in rotation with wheat.

Other tests with cereals that have been undertaken more recently are a comprehensive series of rate and time of seeding tests with wheat (No. 8 field), and tests to determine the factors influencing the occurrence of ball smut, and the best method for the control of the disease (No. 7 field).

GRASS TESTS.

Pasture Top-dressing Tests.

An area of virgin native pasture is divided into five plots of $3\frac{3}{4}$ acres each, four of which have been top-dressed as follows:—Super., 1 cwt. + lime 10 cwt. per acre; super., 1 cwt. per acre; Thomas phosphate, 1 cwt. per acre; super., 2 cwt. + nitrate of soda 1 cwt. per acre. These plots were manured every year from 1914 until 1920, since when the practice of manuring only every fourth year has been followed. The remaining plot has not received any manure.

Originally the plots functioned mainly as demonstration areas, but for the past seven years a record has been kept of the number of days' grazing afforded, and of any loss or gain in the live weight of the sheep. Every year marked differences in the quantity and quality of the pasture provided in the several plots are apparent. The most obvious difference to the eye is in the increased percentage of clovers present on the manured sections.

PASTURE—TOP-DRESSING TESTS.

The results of grazing over the past seven years, together with botanical and chemical analyses of the produce of plots, are summarized in the following table:—

TABLE V.—PASTURE TOP-DRESSING TESTS.

Sheep-feeding Results.

	Super., 1 cwt., Lime, 10 cwt per Acre.		Super., 1 cwt. per Acre.		No Manure.		Thomas Phosphate, 1 cwt., per Acre.		Super., 2 cwt., Nitrate of Soda, 1 cwt. per Acre.	
	Sheep Carried.	Lb. Gain—Live-weight.	Sheep Carried.	Lb. Gain—Live-weight.	Sheep Carried.	Lb. Gain—Live-weight.	Sheep Carried.	Lb. Gain—Live-weight.	Sheep Carried.	Lb. Gain—Live-weight
	Per acre.	Per acre.	Per acre.	Per acre.	Per acre.	Per acre.	Per acre.	Per acre.	Per acre.	Per acre.
Average for seven years, 1920–26 ..	1·1	85	1·0	66	0·7	40	0·9	58	1·1	83
Average for three years, 1924–26 ..	1·4	129	1·1	113	0·7	50	0·9	84	1·4	129

ANALYSES OF MIXED PASTURES (1920).

Botanical Analysis.

	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Grasses ..	21·0	18·0	64·7	49·0	38·5
Clovers ..	74·3	74·8	14·3	36·0	52·4
Weeds ..	4·7	7·2	21·0	15·0	19·1

Analysis of Ash.

Nitrogen ..	2·20	2·28	1·46	..	..
Phosphoric Acid ..	0·46	0·59	0·27	..	..
Lime ..	1·44	1·47	0·60	..	..

The figures indicate that the number of sheep it is possible to keep per acre has been increased approximately 50 per cent. on the plot that has been treated with superphosphate, and rather more where lime and super. have been applied. Further, the sheep on the manured plots have shown a higher gain in live weight per head than have those on the unmanured area.

Improvement of Grasses by Selection.

Efforts are being made to improve the feeding qualities of "Wimmera rye grass." Many individual selections from this grass have been made and grown in stud rows and small plots. One selection that is apparently of a superior type has now been multiplied up, and is undergoing field trial on the bulk areas of the farm.

WHEAT-GROWING IN THE MALLEE.

FIELD DAY AT CARWARP.

More than 500 Mallee settlers, mainly men from the new settlements along the Redcliffs-Merringur line, attended the Farmers' Field Day conducted by the Department of Agriculture at the Carwarp Experiment Plots on Saturday, 5th November.

Visitors to the plots were welcomed by Mr. P. G. Stewart, M.P., on whose farm the plots are conducted, and were then addressed by the Hon. the Minister of Agriculture (Mr. W. Slater), who pointed out that the Government realized the great value of experimental and research work in agriculture, and declared that every effort would be made to continue that work.

During the afternoon visitors were conducted over the plots by Mr. H. A. Mullett, Superintendent of Agriculture, who explained the nature of the tests being carried out and outlined the results that had been obtained up to the present.

Although the season had been dry, he said, and the yields on the plots likely to be light, in determining to proceed with the field day the Department had in mind that settlers would be more than usually interested in the comparisons between various methods of tillage, the rates of manuring, and the yields of wheat varieties and oats that the plots afforded. So far, the total rainfall for the year had been 510 points in 43 separate falls, averaging about 12 points a fall.

The rainfall during the growing period to date was 325 points.

The best fall for the twelve months was 48 points on 1st September, and the dryness of the fallowing period might be gauged by the fact that only 535 points fell during the twelve months prior to sowing the plots this year.

The sowing of the plots was deferred until early in July this year, about six weeks later than usual. This was done in order to secure uniform germination on a moist seed bed. Had the plots been sown early irregular germination, upsetting to uniformity of conditions, must have resulted.

Details of the experiments are as follow:—

1.—Cultivation Tests.

Rajah wheat sown on the 4th and 5th July. Plots ½ acre, 55 lb. graded seed, 80 lb. 22 per cent. superphosphate per acre. Seed pickled with dry copper carbonate.

Plot. No.	Treatment.
Summer Fallow.	
1	Skim ploughed February, scarified and harrowed July.
2	Skim ploughed March, ploughed July, worked standard manner.
3	Skim ploughed March only, worked standard manner.
4	Scarified March, July, worked standard manner.
Winter Fallow.	
5	Ploughed 2 inches deep July, worked standard manner.
6	Ploughed 3½ inches deep July, worked standard manner.

Plot No.	Treatment.
Winter Fallow—continued.	
7	Ploughed 6 inches deep July, worked standard manner.
8	Ploughed 3½ inches deep July, worked deeply.
9	Ploughed 3½ inches deep July, worked dry.
10	Ploughed July, worked.
11	Ploughed October, worked.
12	Ploughed July, neglected.
13	Ploughed October, neglected.
14	Ploughed just before seedtime.
15	Border plot.

2.—Manurial Tests.

Federation Wheat sown 2nd and 3rd July. Area plots 1 acre; 55 lb. graded seed per acre. Seed pickled dry copper carbonate.

Plot No.	Manure Per Acre.
1	Super., 140 lb. per acre.
2	Super., 30 lb. per acre.
3	Super., 60 lb. per acre.
4	No manure.
5	Super., 90 lb. per acre.
6	Super., 120 lb. per acre.
7	Super., 30 lb. per acre.
8	Super., 60 lb. per acre.
9	No manure.
10	Super., 90 lb. per acre.
11	Super., 120 lb. per acre.

3.—Variety Tests—Wheat.

Area Plots ¼ acre. Sown 29th, 30th June. Seed 55 lb. per acre. Superphosphate 80 lb. per acre.

1. Yandilla King.
2. Currawa.
3. Federation.
4. Nizam.
5. Free Gallipoli.
6. Sepoy.
7. Ghurka.
8. Federation.
9. Currawa x Major x Gallipoli, W5319F313.
10. Indian F. x Federation, L4119.2.11.2.
11. Ranee.
12. Mogul.
13. Federation.
14. Rajah 228.
15. Rajah.
16. Ranee x Rajah W5013E4.
17. Federation.
18. Confederation.
19. Mac's White.
20. Wandilla.
21. Bena.
22. Federation.
23. Merridin.
24. Nabawa.

4.—Replicated Tests—Wheat.

The Department considers that the time has been reached when it is desirable to compare more accurately the yields of the following new wheats—

Free Gallipoli,
Sepoy, and
Ghurka—

with standard wheats like Yandilla King, than is possible in single plots. Accordingly each variety has been sown alongside Yandilla

King in pairs four times repeated. By this method it is hoped to obtain much more reliable comparisons than formerly. The Department does not propose to recommend the use of any variety which cannot demonstrate its superiority in these plots.

Yandilla King.	Yandilla King.
	Sepoy.
Yandilla King.	
Free Gallipoli.	Sepoy.
	Yandilla King.
Free Gallipoli.	
Yandilla King.	Yandilla King.
	Ghurka.
Yandilla King.	
Free Gallipoli.	Ghurka.
	Yandilla King.
Free Gallipoli.	
Yandilla King.	Yandilla King.
	Ghurka.
Yandilla King.	
Sepoy.	Ghurka.
Sepoy.	
Yandilla King.	

5.—Rate of Seeding Tests.

Rajah wheat sown 1st July. Varying rates of seed pickled with copper carbonate. Super. 22 per cent., 80 lb. per acre.

Plot.		Plot.	
1	45 lb. per acre.	3	75 lb. per acre.
2	60 lb. per acre.	4	90 lb. per acre.

6.—Variety Tests—Oats.

Sown 1st July. Seed 60 lb. per acre. Super. 22 per cent., 80 lb. per acre.

Plot No.		Variety.	Plot No.		Variety.
1	...	Palestine	5	...	Lachlan
2	...	Burt's Early	6	...	Mulga
3	...	Sunrise	7	...	Belar
4	...	Algerian			

Results from Experimental Plots.

In submitting results for the yields of the plots for 1926 and previous years, Mr. Mullett pointed out that the Department wished to emphasize the fact that its policy was not to recommend the sowing of varieties of wheat or oats which had not been sown in the plots and given satisfactory yields for at least three years. This precaution was necessary, because, owing to the fluctuations in the yields of varieties occurring in some seasons, it had been noticed frequently that varieties which did well in a good season had failed when the supplies of soil moisture were less abundant.

Yields 1926, and Averages Since Tests Started.

Cultivation Tests.

Fourteen Plots each ½ acre, sown to Rajah wheat, 17th and 18th May, 50 lb. seed and 75 lb. super. per acre. The pickle used was copper carbonate, 2 oz. per bushel.

Summer Fallow.	Yield 1926. Bushels per acre.	Average 1925–1926. Bushels per acre.
*Ploughed February, ploughed winter† ...	15.0	15.5
Ploughed March, ploughed winter† ...	16.6	16.1
Ploughed March, spring-toothed winter†	17.2	16.0
Spring-toothed March, spring-toothed winter†	18.3	16.6
Winter Fallow.		
Ploughed July, 2 inches deep†	17.3	15.5
Ploughed July, 3½ inches deep† ...	18.3	16.7
Ploughed July, 6 inches deep† ...	18.3	16.4
Ploughed July—spring-toothed (deep) ..	18.4	15.7
Ploughed July—spring-toothed (dry) ..	18.0	14.9
Ploughed July—spring-toothed† ...	18.8	16.1
Ploughed late (October)†	16.5	14.1
Ploughed July (neglected)†	16.7	12.4
Ploughed May, 1926 (non-fallow)† ...	11.1	9.0
Ploughed October (neglected)† ...	16.2	12.6

Last year Rajah wheat was sown on these plots, and, unfortunately, this was badly battered by high winds which swept the district when the crop was ripe, but before it was harvested. The heaviest plots naturally suffered most, and the early summer fallowed plots at the west end of the field bore the brunt of the storm. Plots on which the crop was light and thin suffered hardly at all, hence the yields on these were relatively inflated.

The average yields since the plots were started two years ago are appended. They are to be regarded as more reliable than the results for last year.

It will be observed that the average yields on the plots fallowed are practically double those on the non-fallowed land, while those on late fallow and on neglected fallow are definitely below the yields on carefully fallowed plots. This is a lesson which settlers in the North Mallee are taking to heart, and the substitution of fallow for non-fallow, and well-worked fallow for neglected fallow, would go a long way towards ensuring a steady sequence of satisfactory crops.

The average results disclosed no significant differences between summer fallow and winter fallow, or between the various depths of ploughing tested, but it is to be expected that some will be apparent as time goes on. Some modification of the layout of the tests has been made this year to ensure greater accuracy.

* Corresponding fields ploughed March, 1925, and spring-toothed in July.

† Except where otherwise stated, depth of ploughing 3½ inches, and fallows spring toothed and harrowed as required after rain to maintain mulch 2½ inches deep

Results of Manurial Trials.

Federation wheat sown 14th and 15th May. 55 lb. graded seed, pickled with copper carbonate.

Quantity of manure per acre.	Yield per acre. Bushels.
No manure	23.6
Super. 30 lb. per acre	25.4
Super. 60 lb. per acre	25.6
Super. 90 lb. per acre	23.7
Super. 120 lb. per acre... ...	24.7

The above table shows that no increases in yield were obtained where dressings of superphosphate above 60 lb. per acre were used.

The average yields since the plots were started, however, are to be regarded as a very reliable indication of the value of superphosphate under average conditions in the Northern Mallee. While, on the majority of occasions, the plots were sown on fallowed land, on three occasions, in 1916, 1921, and 1922, they were sown on new land not fallowed. The most profitable dressing of manure applied in those years was 60 lb. an acre.

Average Yield for 11 Years (1916-1926).
Showing Increase Due to the Use of Super.

Quantity.	Average Yield per acre 1916-1926.	Increase over no manure.	Value of Increase at 5s. bushel.	Cost of Manure at £5 12s.	Net Profit per acre due to Manure.
	Bushels.	Bushels.	s. d.	s. d.	s. d.
No Manure	11·3	...	..	..	..
Super 30 lbs. per acre ..	14·0	2·7	13 6	1 6	12 0
Super 60 lbs. per acre ..	14·9	3·6	18 0	3 0	15 0
Super 90 lbs. per acre ..	15·4	4·1	20 6	4 6	16 0

Variety Trials.

Yield of Wheat Varieties, 1926.

Graded wheat sown, 50 lb. per acre on 1st and 2nd July, pickled with copper carbonate. Super. 75 lb. per acre.

	Bushels per acre.		Bushels per acre.
Wandilla	31.7	Yandilla King ...	25.8
Bena	30.5	Federation	25.6
Ghurka	29.1	Mogul	25.5
Free Gallipoli ...	28.5	Nizam	25.4
Confederation ...	28.5	Federation	24.9
Nabawa	28.5	Merridin	24.5
Ranee x Rajah W5013 E4	27.1	Rajah 278	23.3
Ind. F x Federation LY119.2.11.2 ...	27.1	Currawa	23.2
Sepoy	26.8	Sovereign	22.8
Ranee	26.8	Rajah	22.2
Omrah ...	26.1	Golden Grain x Bobs ...	20.7
		Macs White	20.4

AVERAGE YIELDS FOR 4 YEARS, 1923-26.

	Bushels.		Bushels.
Sepoy	21.4	Rajah	19.3
Ghurka	21.3	Mogul	19.3
Yandilla King ...	20.8	Macs White	19.3
Confederation ...	20.6	Currawa	19.2
Omrah	20.2	Nizam	19.0
Free Gallipoli ...	20.1	Sovereign	18.3
Ranee	19.9	Federation	18.1

Rate of Seeding Tests.

Rajah wheat sown 16th May. Varying rates of graded seed. Pickled with copper carbonate. Manure, 75 lb. of 22 per cent. super.

Rate of Seeding.	Yield per acre. Bushels.
45 lb.	13.8
60 lb.	15.2
75 lb.	14.7
90 lb.	13.1
Average, 1925-1926.	
45 lb.	18.4
60 lb.	18.9
75 lb.	18.8
90 lb.	17.9

VARIETY TESTS—OATS.

Sown with 60 lb. seed on 14th May, 1926. 75 lb. super. per acre.

Lachlan	28.7 bushels.
Palestine	27.0 bushels.
Burt's Early	22.0 bushels.
Algerian	23.3 bushels.
Sunrise	Not harvested, went down flat.
Averages, 1925 and 1926.	
Lachlan	23.4 bushels.
Palestine	22.6 bushels.
Burt's Early	19.2 bushels.
Algerian	17.9 bushels.

GRAPES FOR EXPORT.

A PACKING EXPERIMENT.

(Conducted by Basil Krone, Fruit Packing Expert, Horticultural Division.)

Last season, when grapes were being packed for export to London, Vancouver, and New York, a quantity was packed at the same time and placed in the Government Cool Stores to ascertain which method of packing gave the best results. Similar methods of harvesting, handling, and storing were followed with all the grapes. Some, however, were packed in sterilized granulated cork (the usual procedure for export) and others in sulphite tissue paper (size 15 inches x 14½ inches), and wood-wool. The boxes used were the South African type, the outside measurements of which are 18 inches x 12 inches, and the depth optional. On each lid there were cleats so as to permit air circulation between the cases. Each case contained a single layer of bunches only. The boxes were made with very close-fitting boards, and therefore were airtight.

The grapes, which were of the Ohanez variety, were packed during the last week in March and the first week in April at the vineyards of Messrs. F. Parker, Lemnos, and N. McPherson, Shepparton. They were forwarded by goods train to the Government Cool Stores, Victoria Dock, Melbourne, where they remained during the period of the experiment at a steady temperature of 32-33 degrees. Appreciation and thanks are due to Messrs. Parker and McPherson for assistance given in carrying out the test.

All the grapes kept remarkably well for five months. This uniformity in keeping quality may have been due to the comparative dryness of the season preceding the harvest. After five months, however, the grapes in the granulated cork commenced to show some waste, while those in the tissue paper, without exception, remained in excellent condition, even the bloom and freshness of the berries being preserved; some dryness of the stalks was apparent, but this did not appear to affect the quality or flavour in any way.

At the Royal Show, in September, some of the grapes were on exhibition, and retained their splendid condition for the period they were out of the store (ten days) on the show bench. Another lot was sent away on the Better Farming Train and remained on exhibition a fortnight during the tour of the train through some of the northern districts of the State. Towards the end of September another lot was sent to Shepparton, where it was on view for some time in a shop window in the town. Again, another lot, this time the last of them, was exhibited at the Shepparton Agricultural Show on the 25th and 26th October (seven months after the grapes had been harvested). Those packed in tissue paper and wood-wool were still in excellent condition, but those in the cork showed a large percentage of waste. In referring to the exhibit the *Shepparton News* of the 19th October said—

" . . . The upper portion of the tissue paper was removed so that the grapes could be seen. The 'bloom' on the fruit was just as

it was when the bunches of grapes were plucked. . . These grapes have been kept in unimpaired condition for six months, and it follows that there should be no difficulty whatever in sending grapes in a marketable state from Australia to London. Another case in granulated cork tells a different tale. The difference is apparent at a glance, the cork packing giving the unsatisfactory result of a big percentage of mouldy berries, and none of the grapes having any ' bloom ' on them."

Summary of Results and Useful Hints.

Grapes may be kept fresh in granulated cork, but they will retain a better appearance and keep longer if packed in tissue paper and wood-wool.

Cost of packing material—

Granulated cork—One shilling per box.
Tissue paper and wood-wool—One penny halfpenny per box.

Pack only when the bunches are dry. See that the *centres* of the bunches are thoroughly dry after the morning dew before picking.

With grapes intended for export, none should be included on which rain has fallen or to which an artificial watering has been given within a week of harvesting.

Handle bunches by the stalks to preserve the "bloom" and to avoid damage at the pedicels.

Trim carefully all inferior and unmarketable berries from the bunches before packing.

Pack tightly; the security of the pack lies in its "snugness." Slack packing means damaged fruit.

After packing, despatch without delay for cool storage. Quick cooling of the fruit counts considerably in the length of time it will keep.

Cool-store at a temperature of 32-33 degrees.

TRIAL SHIPMENT OF ORANGES TO ENGLAND FROM SOUTH AUSTRALIA.

Interest attaches to an experiment made with a cargo of 235 cases of South Australian oranges, shipped to Great Britain by the *Bendigo*. Excluding six cases in various wrappers, which were sent for special investigation to Dr. Barker, of Cambridge University, half of the cargo was carried in cold chambers, and the balance under ordinary cargo conditions between decks, without even a through draught. In appearence and condition there was no difference between the two lots, but on being tasted, those carried in cold store showed a fuller and finer flavour. The wastage was 1½ per cent. on large fruit, and none on the smaller fruit. The results are considered excellent, and were unexpected, says the *Imperial Food Journal*.

STALLION REGISTER 1927-28,

under the Horse Breeding Acts 1919 and 1925.

Part II*.—Registered from 1st August to 30th September, 1927,

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
699	Abie	3	Pony ..	Handcock, S. ..	Rathdown - street, North Carlton
551	Abbotsford II. ..	A	Draught ..	Watts, W. ..	Kamarooka
679	Abbots Pride ..	A	,, ..	Gadd, W. H. ..	The Glen, via Wodonga
501	Admiral Fyvie ..	4	,, ..	Mitchell & O'Brien	City Horse Bazaar, Melbourne
709	Admiral Howard	A	,, ..	Holland Bros. ..	Sheep Hills
700	Admiral Sperry ..	A	,, ..	Sheehan, W. ..	South Muckleford
618	Albion	A	,, ..	Oakes, Jas. ..	Nathalia
502	Alexander's Fabric	4	,, ..	Mitchell & O'Brien	City Horse Bazaar, Melbourne
584	Allandale ..	6	,, ..	Burdett, T. H. ..	Hopetoun
707	Almont, M. ..	A	Light ..	Minns, J. ..	Melton
712	Armadale's Elect ..	5	Draught ..	Colliver, R. V. ..	Koo-wee-rup
669	Ashton Stamp ..	4	,, ..	Winnett, G. H. ..	Reedy Flat
623	Aurelius ..	6	Light ..	Lett, N. S. ..	Box 11, Sale
491	Axedale Prince ..	A	Draught ..	McDonald, J. ..	Box 102, Ultima
472	Baron Alex ..	5	,, ..	Pearse, R. L. ..	Kewell North
534	Baron Brilliant ..	5	,, ..	Gillett, W. H. ..	Lara
490	Baron Brilliant ..	6	,, ..	Murphy, M. P. ..	Rupanyup
474	Baron Carlyle ..	A	,, ..	Charles, W. ..	Maldon
478	Baron Chief ..	4	,, ..	McIntyre, S. E.	P.B. No. 2, Condah
689	Baron Crombie ..	A	,, ..	Charles, W. ..	Maldon
714	Baron Douglas ..	A	,, ..	Petrie, Jno. ..	St. Arnaud
519	Baron Fashion ..	A	,, ..	Hamilton, A. L...	Corryong
467	Baron Grove ..	4	,, ..	Paterson, J. ..	Numurkah
569	Baron Juno ..	A	,, ..	T. Wallbridge Pty. Ltd.	365 Flinders-street, Melbourne
625	Baron Watson ..	A	,, ..	McErvale, J. L.	Brewster
655	Baronet.. ..	5	,, ..	Cameron, A. ..	Warracknabeal
592	Baron's Royal Chief	A	,, ..	Parry, T. E. ..	East View, Coonooer Bridge
477	Baroona Boomerang	3	,, ..	Cooke, S. W. ..	Murndal, Hamilton
696	Belgian's Choice ..	3	,, ..	Bunge, H. J. ..	Sheep Hills
656	Belmont ..	A	,, ..	Poynton, J. T. ..	Ensay South
636	Berkeley Bantam	A	Pony ..	Crozier, R. ..	South Morang
556	Blue Trout ..	A	Thoro'bred	Scott, H. ..	Lillimur
574	Bold Agitation ..	A	Draught ..	Crabb, G. ..	Colac
635	Bold Captain ..	A	,, ..	Werner, C. B. ..	Nhill
531	Bold Craig ..	6	,, ..	Collins, J. A. ..	Fenton's Creek
503	Bold Success ..	4	,, ..	Rumbold, Jno. ..	Laanecoorie
476	Bonnie II. ..	4	,, ..	Price, R. ..	Wallacedale South
653	Boquhan Kennedy	A	,, ..	Brown, P. L. G...	Cohuna
634	Border Prince ..	A	,, ..	West, N. S. R. ..	Corop
624	Bournie Alto ..	6	Light ..	Caldwell, Miss E.	White Hills, Bendigo

* Part I.—Registrations up to the 31st July—was printed in this *Journal* for October.

STALLION REGISTER, 1927–28—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
516	Bright Treasure ..	6	Draught ..	Thompson, M. ..	Yalca
505	Brilliant Bold ..	6	,, ..	Larcombe, R. H.	Mt. Moriac
504	Brilliant Day ..	4	,, ..	Mitchell & O'Brien	City Horse Bazaar, Melbourne
637	Brilliant Jim ..	5	Pony ..	Scott, R. N. ..	Kongwak
506	Brilliant Morn ..	4	Draught ..	Mitchell & O'Brien	City Horse Bazaar, Melbourne
610	Briton's Pride ..	A	,, ..	Cameron, A. ..	Englefield
601	Bronte Deen ..	3	Light ..	Thomson, H. K.	Newlyn
565	Bushlark ..	A	,, ..	Penaluna, W. H.	Boolarra
613	Cannonite ..	A	Pony ..	Graves, J. G. C.	Mt. Battery, Mansfield
620	Carmichael ..	A	Draught ..	Newman, W. ..	Benalla
520	Carmyle ..	6	,, ..	Stokes, S. ..	30 Islington-street, Collingwood
489	Cherry Farm Standard	A	,, ..	Clifford, A. ..	Donald
482	Clyde Bank ..	4	,, ..	Hannon, Jno. ..	Swan Hill
678	Clyde Laddie ..	A	,, ..	Alexander, Jno...	Caniambo
523	Colonel Garfield ..	A	,, ..	Millard Bros. ..	Dean's Marsh
723	Conqueror ..	A	,, ..	McKinnon, M. ..	Berriwillock
469	Craig Athol ..	5	,, ..	Green, A. ..	Marungi
596	Craig Lion ..	5	,, ..	Collis, A. ..	East Melbourne
614	Craigielea of Aberdour	A	,, ..	Stewart, R. ..	Tolmie
573	Craigieright ..	6	,, ..	Jorgenson, A. C.	Katyil
727	Cymbrel ..	A	Light ..	Hancock, S. ..	Poowong
667	Dan Bells ..	A	,, ..	Gregerson, H. G.	Benalla
544	Dandy Boy ..	3	Pony ..	Webb, H. ..	Beeac
611	Dandy Lad ..	A	,, ..	Stuckey Bros. ..	Flynn
639	Dandy Luck ..	5	,, ..	Johnson, Mrs. M.	Mount View, Mernda
582	Decorator ..	A	,, ..	Jennings, F. E. ..	Inglewood
701	Didymo of Pennivells	A	,, ..	Maclellan, Mrs. ..	Dandenong-road, Windsor
494	Don Huon ..	A	,, ..	Lyons, W. ..	Drouin
688	Drumry's Pride ..	3	Draught ..	Maher, J. ..	Tatura
576	Duke Little Eyes..	A	,, ..	Bowman, A. E.	Tallangatta
589	Dundonald's Chief	A	,, ..	Doherty, H. ..	Yundool, St. James
524	Eaton Headlight	A	,, ..	Schneider, E. W.	Yulecart
507	Ebony Stamp ..	4	,, ..	McCrae and Thornton	Bulla
591	Emerson ..	A	Thoro'bred	Blair, A. S. ..	Box 30, Watchem
724	Enterprise ..	5	Draught ..	Gillis, A. ..	Racecourse-road, Newmarket
603	Excelsis Regulus	3	,, ..	Strawhorn, A. ..	Barfold
670	Favourite Lad ..	5	,, ..	Gomm, C. E. ..	Somerville
610	Favourite of Pennivells	4	Pony ..	Maclean, D. ..	Toorak
560	Fitzallan ..	A	Draught ..	Vaughan, S. P. ..	Nyam, via Warracknabeal
566	Flashdale ..	A	,, ..	Rodda, C. S. ..	Warracknabeal
479	Flashlea ..	3	,, ..	Middleton, E. M.	Strathkellar Estate, Hamilton
612	Foreigner ..	A	Pony ..	Ferrari, C. ..	Devondale
615	Galtee	A	Thoro'bred	Walsh, T. ..	Seaton-road, Glenmaggie
521	Gay Bold ..	A	Draught ..	Coates, V. ..	Mt. Jeffcott

STALLION REGISTER, 1927–28—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
698	Gay Seranader ..	A	Thoro'bred	Glennon, T. ..	Epsom-road, Ascot Vale
690	Gay Willie ..	6	Draught ..	King, D., and Sons	Rutherglen
600	General Favourite	5	,, ..	Hall, Wm.. ..	c/o Mrs. Heid, Drummartin-street, Sunshine
643	General Garland ..	5	,, ..	McKinley, H. ..	Rochfort, via Wood-end
568	General Harvey ..	A	,, ..	Byron, H. E. ..	Woomelang
677	Glen Arthur ..	6	,, ..	Alexander, J. ..	Caniambo
577	Glengyle ..	5	Pony ..	Lovett, H. F. J.	Corowa
621	Glenscott ..	A	Draught ..	Gibbins, A. B. ..	Murrabit
675	Grand Huon ..	A	Light ..	Sandwith, J. ..	95 Scott's-parade, Ballarat
508	Granvalier Stamp	4	Draught ..	Mitchell & O'Brien	City Horse Bazaar, Melbourne
585	Guy Fox ..	A	Light ..	Maddison, H. ..	21 Henry-street, Footscray
616	Gwalia Caesar ..	A	Pony ..	McKoy, E. ..	Wodonga
721	Halcyon ..	A	Light ..	Maclellan, J. ..	241 Dandenong-rd., Windsor
686	Harry Rose ..	A	,, ..	Allan, E. ..	Ondit
575	Heather Douglas	6	Draught ..	Young, W. G. ..	Neerim
660	Heather Jock ..	A	,, ..	Dunnett, G. A. ..	Skipton
558	Herdsman's Treasure	A	,, ..	Cobbledick, W. J.	Mayfield, Bunbartha
687	Homeward Bound	A	Light ..	McCamey, D. and J.	Tinamba
659	Honey King ..	A	,, ..	O'Loughlin Bros.	Leongatha
633	Interest ..	A	Pony ..	Kennedy, A ..	Arcadia
632	Ipidi	A	Thoro'bred	Kennedy, A ..	Arcadia
717	Jack Tar ..	A	Draught ..	Dufty, J. C. ..	Lorquon West
561	Jimmy Direct ..	A	Light ..	Isaac, J. ..	Inglewood
713	John Douglas ..	A	Draught ..	King, Jno. ..	Lillimur
473	John Shepherd	6	,, ..	Dahlenburg, A. ..	Salisbury
509	Kenwyn Baron	4	,, ..	Mitchell & O'Brien	City Horse Bazaar, Melbourne
547	Korrsdale ..	3	,, ..	Gillis, A. ..	312 Racecourse-rd., Newmarket
517	Kilty	A	Light ..	Rodwell, H. J. ..	Amphitheatre
708	King Almont ..	A	Pony ..	Clarke, Jno. ..	Silver Hill, Mortlake
480	King Cal ..	5	Thoro'bred	Campbell, D. L. ..	Merino
711	King Clyde ..	A	Draught ..	Bean, W. ..	Sale
537	King Heedless	4	Thoro'bred	Manifold, J. ..	Purrumbete, Weerite
562	King Osterley A.	A	Light ..	Anderson, Geo. ..	Aberdeen - street, Newtown, Geelong
606	King's Pride ..	5	Draught ..	Fallon, Jno. ..	Iona
528	Kitchener's Pride	A	,, ..	Cheesley, A. ..	Barnawartha
719	Lackamore ..	A	Light ..	Cahill, W. R. ..	Ky Valley, Kyabram
607	Lancashire Chief	A	Draught ..	McClounan, T. C.	Green Lake, via Horsham
674	Lee Creek Favourite	A	Draught ..	Ewart Bros. ..	Boundary Park, Dargalong
533	Little Brigham ..	A	Pony ..	Tuckett, J. A. ..	Stony Creek
702	Little Leo ..	6	,, ..	Bray, Mrs. A. ..	Croydon
572	Little Milton ..	A	Draught	Berwick, T. ..	Tempy

STALLION REGISTER, 1927–28—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
510	Lochinvar Ronald	4	Draught ..	Turnbull, D. ..	Ebor, N.S.W.
695	Lonsdale Again ..	6	,, ..	Leighton, J. ..	Yarram
530	Lord Allan ..	A	,, ..	Barnes, L. C. ..	Watchem
605	Lord Dale ..	5	,, ..	Miller, H. ..	Bacchus Marsh
511	Lord Fabric ..	5	,, ..	Bail, E. T. ..	Torumbarry
512	Lord Huntly ..	4	,, ..	Hodgson, R. ..	Jeffcott North
604	Lord Lothian ..	4	,, ..	Turner, A. J. ..	Edgecombe
500	Lord Percival ..	A	,, ..	Beard, Jos. ..	Terang
578	Lord Threave ..	A	,, ..	Schmidt, W. J. ..	Jeparit
654	Lyndhurst ..	A	,, ..	Brennan, L. E. ..	Box 62, Beulah
673	Magic Railway ..	A	Pony ..	Wilkin, Jessie ..	278 Toorak-road, South Yarra
676	Major Dale ..	A	Draught ..	Forster, J. ..	Boort E.
540	Major Lee ..	5	,, ..	Menzel, E. V. ..	Armytage
563	Major Ribbonwood	A	Light ..	Grabsch, F. W. ..	Horsham
672	Mallee Chavalier ..	6	Draught ..	Hammill, W. A.	Sale
571	Maori	A	,, ..	Müller, K. ..	Carwarp
493	Maori Jack ..	A	,, ..	Potter, A. ..	Naroghid
691	Marcellus II. ..	A	,, ..	Forrest Bros. ..	Orford, Port Fairy
532	March Along ..	A	,, ..	Carr, H. ..	Manangatang
593	Marchfield ..	6	,, ..	Skelly, J. ..	St. Arnaud
705	Maritimus ..	A	,, ..	Opie, T. J. ..	59 Sackville-street, East Kew
720	Marquis of Lorne	5	,, ..	Waddell, A. ..	Cann River
495	Marshall Clyde ..	A	,, ..	Fraser, R. F. ..	Birchip
646	Marvin's Heir ..	A	Light ..	Cantwell, J. ..	Flagstaff Hotel, Dudley-st., West Melbourne
641	May Duke of Pennywells	4	Pony ..	McLean, D. ..	"Montrose," Irvine-road, Toorak
542	Merry Prince ..	4	Draught ..	Rogers, B. ..	Mepunga E.
693	Middlemarch ..	A	,, ..	Egan, M. J. ..	Charlton
617	Middlerigg What's Wanted	A	,, ..	McKoy, E. ..	Wodonga
485	Miniature III. ..	A	Pony ..	Robertson, T. ..	Moyne Falls, Macarthur
681	Montrose ..	6	Draught ..	McNaughton Bros.	Wycheproof
671	Nelson Chief ..	4	,, ..	Morrish, L. ..	Bullarook
471	Nether Craigends	5	,, ..	Thornton, T. ..	Waaia
597	Netherall ..	5	,, ..	Ferguson, J. B. ..	Waubra
682	Newton Mains ..	A	,, ..	Shanahan, J. ..	Crossley
535	Newton's Pride ..	4	,, ..	Ibbs, J. T. ..	Camperdown
684	Ngapar	A	Light ..	Allan, E. ..	Ondit
645	Novel Song ..	A	Thoro'bred	Robbie, W. A. ..	Wangaratta
628	Nutshell ..	A	Pony ..	Whitehead, H. W.	Port Fairy
486	Orion	A	Thoro'berd	Larsen, P. ..	Eskdale
570	Our Marvin ..	A	Pony ..	Jenkins, G. G. ..	Cudgee
683	Patriot II. ..	6	Draught ..	Ewing, J. W. ..	Ponshurst
726	Patrus	6	Thoro'bred	Biggar, R. ..	Waaia
549	Peris Huon ..	5	Light ..	Hines, G. W. ..	Camp-street, Beechworth
626	Pettadale ..	A	Draught ..	McIlraith, B. ..	Watchem
595	Pleasant Journey	4	Light ..	Pharoah, W. G.	Warragul
608	Preble	A	Pony ..	McKenzie, A. F.	Hexham
631	Premier Jack ..	A	Draught ..	Vaughan, V. ..	Condah
627	Pride of Clutha ..	A	,, ..	Linginberg, J. ..	Foxhow
587	Prince Charles ..	A	Pony ..	Dawkins, J. ..	Colac

STALLION REGISTER, 1927–28—*continued.*

Cert. No	Name.	Age.	Class.	Owner.	Address
		Yrs.			
622	Prince Dale ..	A	Draught ..	Downey, J., & Son	Wallace
588	Prince Ecuador ..	A	Thoro'bred	Hender, F. ..	Broomfield
644	Prince Newton ..	5	Draught ..	Jamieson, Jno. ..	Chintin, via Wallan
649	Prince Wigton ..	A	Draught ..	Studman, Wm. ..	Lucknow
661	Raron	4	Thoro'bred	Young, A. and J.	Blackheath, via Horsham
642	Rascel	3	Arab ..	McLean, Mrs. D.	Yan Yean
685	Referee ..	A	Draught ..	Allen, E. ..	Ondit
536	Resolution ..	3	,, ..	Rodgers, P. ..	Dimboola
666	Robert Bruce ..	A	,, ..	Gregerson, H. ..	Benalla
496	Roseleaf Baronet..	A	,, ..	Trimble, R. ..	Rutherglen
497	Roseneath Donald	6	Draught ..	Creighton, A. ..	Tungamah
619	Roseworthy ..	A	Light ..	Allen, E. ..	Ondit
664	Rothmont ..	A	,, ..	Meek, E. T. ..	Streatham
564	Royal Craig ..	A	Draught ..	Trimble, H. ..	Pine Lodge
545	Royal Dale ..	3	,, ..	Kennedy, M. ..	Winslow
602	Royal Hiawatha ..	3	,, ..	Jolliffe Bros. ..	Newlyn
525	Royal Peter ..	5	,, ..	Straube, E. G. ..	Manangatang
579	Royal Style ..	A	,, ..	Morrissey, P. ..	Molesworth
481	Royal Top ..	3	Pony ..	McKebery, C. ..	Coleraine
580	Scotch Prince ..	A	Draught ..	Evans Bros. ..	Redcamp, Moyhu
539	Scotland Again ..	4	,, ..	McDonald, A. ..	Mt. Wallace
555	Scotland's Bloom	A	,, ..	Rodgers, R. B. ..	Tooan, via Natimuk
546	Scotsdale ..	4	,, ..	Crozier, W. ..	South Morang
514	Scottish Leader ..	3	,, ..	Mitchell & O'Brien	City Horse Bazaar, Melbourne
663	Scotty's Pride ..	5	,, ..	Rutherford, Wm.	Nandaly
498	Several	A	Thoro'bred	Winter-Cooke, S.	Hamilton
703	Shantella ..	A	Draught ..	Roulston, D. H...	Myola, via Tooleen
492	Shanter Junior ..	A	,, ..	Muhleison, C. ..	Wooreen, via Leongatha
609	Shepherd's Boy ..	A	,, ..	Kelly, I. ..	Korong Vale
650	Sir Andrew ..	6	,, ..	Cook, W. J. ..	Tempy
518	Sir Dale ..	A	,, ..	Sands, A. ..	Sea Lake
692	Sir Douglas Haig ..	A	,, ..	Lincoln, J. ..	Portarlington
487	Sir George ..	A	Pony ..	Russell, J. K. ..	Barunah Plains, Hesse
522	Sir George Robin	4	Draught ..	Redford, H. ..	Nurcoung
541	Sir Richard III. ..	5	Pony ..	Henderson, W. ..	Grasmere
552	Sir William ..	A	Draught ..	McQueen Bros. ..	Waubra
488	Slip Knot ..	6	,, ..	Exors. late Jas. -- Russell	Barunah Plains, Hesse
630	Sportsman's Hero	A	,, ..	Kennedy, A. ..	Arcadia
716	Starlight ..	A	Pony ..	Giles, Jno. ..	Sunnyside, Bairnsdale
594	Steel Blade ..	5	,, ..	Booley, M. ..	Galah
657	St. Mark ..	A	Draught ..	George, C. W. ..	Heather Bank, Beulah
483	Sum Time ..	A	,, ..	Nicholson, R. ..	Pirlta
526	Tam O'Shanter Bill	A	Pony ..	Gordon, G. ..	Ellerslie
668	Theale Padlock	5	Draught ..	McLeod, W. ..	Lucknow
567	The Design ..	A	Light ..	Carter, W. J. ..	438 Barkley-street, Elwood
499	The Pride ..	A	Draught ..	Montgomery, J. E.	Leongatha
704	The Standard ..	A	,, ..	Forsyth, J. ..	Murrayville
598	The Toff ..	5	Pony ..	Kenyon, R. M. ..	Sale

STALLION REGISTER, 1927–28—*continued.*

Cert. No.	Name.	Age.	Class.	Owner.	Address.
		Yrs.			
553	The Voyager ..	A	Light ..	Robinson, J. T.	"The Grange," Tongala
651	The Warrior ..	A	Pony ..	Hamilton, A. L...	Corryong
581	Tresco	A	Light ..	Bowman, A. E.	Bethanga Park, Ebden
665	Tressayr ..	A	Thoro'bred	Widdicombe, F...	Gymbowen
475	Trimmer ..	3	Draught ..	Grey, G. ..	Branxholme
557	Udale	A	,, ..	Holdsworth, J. ..	Jung Jung
680	Udale Jack ..	A	,, ..	Pyers, A. J. ..	Donald
599	Unaford Quality ..	3	,, ..	Little, W. ..	Clyde
718	Vanguard ..	A	,, ..	Lord, G. and W.	Flynn
538	Viceroy Favourite	3	,, ..	Harris Bros. ..	Garvoc
697	Vue Dale ..	5	,, ..	Quick, W. W. ..	Molonghip
515	Waikoura ..	4	,, ..	Francis, G. W. ..	Lower Norton
694	Waironga Clyde ..	6	,, ..	Connelly Bros. ..	Whirley, via Birchip
638	War Lord ..	5	,, ..	Attenborough, T.	Kirk Hill, Poowong Nth.
710	What's Wanted ..	4	,, ..	Coates, V. ..	Jeffcott
548	Widgiewa Blackwood	4	,, ..	Gillis, A. ..	312 Racecourse-rd. Newmarket
647	Widgiewa Dale ..	5	,, ..	Bunworth, J. ..	Culgoa
586	Widgiewa Glancer	6	,, ..	Wilkinson, W. G.	Yarrawonga
583	Widgiewa Ivo ..	A	,, ..	Wilkinson, W. G.	Yarrawonga
658	Widgiewa Leo ..	4	,, ..	Thomas, F. C. ..	Galaquil
652	Widgiewa Ninian	6	,, ..	Brown, P. L. G...	Cohuna
550	Widgiewa Norval	3	,, ..	Manager, Research Farm	Werribee
529	William Wallace ..	6	,, ..	Bish, E. ..	Wycheproof
629	Willie Craig ..	A	,, ..	Leishman, A. T.	Kingston
543	Xantho ..	5	Thoro'bred	Whitehead, J. C.	Goodwood, Minhamite
706	Young Badaween	A	Pony ..	Baensch, A. ..	St. Arnaud
648	Young Hero	A	Draught ..	Branson, J. ..	Lake Cooper
484	Young, Ki Ki ..	A	Pony ..	Robertson, T. ..	Moyne Falls, Macarthur
662	Young Lad ..	A	,, ..	Gillett, W. H. ..	Lara
554	Young Lymney Champion	A	Draught ..	Penaluna, W. H.	Boolarra
559	Young Middlemarch	A	,, ..	McKenzie, J. ..	Dimboola East
722	Young Simon ..	A	,, ..	Sheehan, W. ..	Muckleford
527	Zone Time ..	A	,, ..	Gibson, Jno. ..	Benambra

COLD STORAGE OF NEW ZEALAND APPLES.

An interesting and successful experiment was carried out at Southampton, England, during the last apple export season for the cool storing of a quantity of New Zealand apples, with a view to placing them on the British market towards the end of July and early August, when a good sale would await them. Approximately 6,000 cases of apples, consisting of Sturmers, Statesmen, and Rome Beauty, were picked for the purpose, and were carried on the *Tainui*, the average temperatures in the hold being 35 degrees F. at the top and 33 degrees F. at the bottom.

They were received into store at Southampton on 8th of June, and placed straight into cool store. The temperature of the chamber into which the fruit was put was 34 degrees F., and this figure was maintained throughout the period of storage. At the end of July about 5,500 cases were taken out of store, the remainder being left in order to see how the fruit would stand up to longer storage. Those taken out were in excellent condition, and secured quite good prices at Covent Garden.

Colonel Gray, of the New Zealand Fruit Board, has made the following statement in regard to the experiment:—"I am delighted with the results. The apples have come out of store in splendid condition, and I also believe that the success of the experiment has done much to remove an opinion current in the trade that New Zealand apples, late in the season, frequently don't stand up. I have wanted to disprove the statements to this effect, and now the trade has been given a practical proof that apples from the Dominion will stand up.

I cannot speak too highly of the care and attention the apples had received at Southhampton, under the able supervision of Mr. Aitken. The general arrangements at the stores were admirable in every way, and the conditions for the carrying out of the experiment at the International Cold Storage and Ice Co. Ltd., Southampton, of which Mr. Aitken is General Manager, had been ideal. The fruit was lifted direct from the boat into the store, every facility for its efficient handling and storing was provided, and the proximity of the railway gave convenient access to the centre of distribution.

At the end of last month those apples which had been left in storage were in splendid condition."

ORCHARD HEATING IN U.S.A.

According to Mr. Floyd D. Young, Meteorologist, U.S.A. Weather Bureau, there has been a rapid increase in the citrus acreage equipped with orchard heaters during the past five years. The freezes of January and February, 1922, demonstrated the need for frost protection, and the severe damage suffered in December, 1924, and January, 1925, resulted in the purchase of heating equipment for thousands of acres of oranges and lemons. In the Redlands district the increase in the protected citrus acreage during the season of 1925-26 was 118 per cent.

The writer goes on to state that "there has long been a demand for orchard heating statistics for the different citrus districts, but the large amount of work necessary to gather the information necessitated a delay in taking up the project until last winter. During the winter of 1926-27 the entire Fruit-Frost organization of the weather bureau co-operated in making an intensive orchard heating survey. The districts covered do not include all the citrus acreage in California, but there is relatively little orchard heating in the districts not covered. The survey was made with the greatest care in all districts. In most instances the statistics were secured through personal interviews with the growers, with the assistance of the packing-house managers.

Orchard Heating Statistics.—The percentage of the total citrus acreage protected with heaters is greatest in the Pomona district, with 59.4 per cent., and least in the Lindsay district, with 4.1 per cent. The Azusa district, with 54.3 per cent. of the total acreage protected, runs Pomona a close second. Of the subdivisions, the Walnut district has the highest score in protected acreage, with 86.6 per cent. of the total citrus plantings equipped with heaters. It is interesting to note that there was no heating in the Walnut District in 1922.

Only 22.07 per cent. of the total citrus acreage in all the Fruit-Frost districts is equipped with heaters. Oil burning heaters are used to protect 20.57 per cent. of the total acreage, the remaining 1.50 per cent. burning solid fuel. Of the total protected acreage 93.2 per cent. is equipped with oil heaters and 6.8 per cent. with solid fuel heaters.

In some districts large numbers of open heaters have been placed in use within the last few years, and growers have been known to replace with improved types of heaters—the garbage cans. Open heaters give off a much denser and dirtier smoke than the improved types, and although they are cheap and are effective in raising the temperature, they usually coat a large proportion of the fruit with a greasy soot, which is difficult and sometimes impossible to remove at the packing house. Growers have been known to lose 50c. per box on oranges because of a reduction in grade due to a coating of soot from open heaters which could not be entirely removed. In other cases the unusually heavy scrubbing which the sooty fruit receives in washing has increased the percentage of decay in transit. The elimination of all open heaters in southern California will benefit both the grower and the general public.

RUSSIA TO PURCHASE HORSES FOR FARMING.

According to a recent newspaper report, the Commissariat of Agriculture in Soviet Russia is planning to organize a special joint-stock company with participation of State, co-operative, and possibly private capital, for the purchase and distribution of horses among the Russian people to meet a widespread shortage of draft horses.

Shortage of draft horses, says the report, hinders considerably agricultural progress in Russia. Since the World War the acreage per work horse has almost doubled in the principal agricultural regions, the Central Black Soil, the Lower Volga, and the North Caucasus.

The rate of increases among these horses lags behind the increase of agriculture. Disorganization of the market and high prices prevent the purchase of horses in regions where there is a surplus, such as Siberia, Kazakstan, &c.

The price of a horse in those regions ranges from £9 to £13. In districts where there is a deficit of supply prices for horses range from £23 to £30.

It is said that the high prices of horses are due to heavy marketing and overhead expenses of the purchasing organizations, particularly of agricultural co-operatives.

AMERICAN GRAPE PRODUCTION, 1927.

The grape crop of the United States this year is approximately 20 per cent. larger than the average production of the last five years, according to an announcement recently made by the Department of Agriculture.

How to dispose profitably of the large production of grapes between now and December is the problem it is said confronting grape-growers and shippers, particularly those in California, where 90 per cent. of the crop is produced. Recent seasonal shipments of fresh grapes have amounted to 75,000 or 80,000 cars. In addition, many thousands of tons must be disposed of locally by drying or other manufacturing process.

This season's total grape crop of some 2,500,000 tons probably will be at least 8 per cent. heavier than last year's large crop, and about 20 per cent. above the average production of the last five years. Eastern grapes may be a relatively short crop, compared with 1926, but the California production has been increasing each season. Growers are renewing their co-operative efforts in the handling of this important product.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

Spraying.

The spray pump should now be in thorough working order, so that the various spring sprayings may be carried out with as little interruption as possible. It is always wise to clean out the pump after each spraying, so that it will be ready for the next mixture. Putting a different spray in a pump barrel that has not been washed out very often causes the formation of a sediment, which blocks the nozzle and interrupts the work.

During November it will be necessary to spray for codlin moth, peach aphis, pear slug, and various leaf-eating insects. In addition, black spot of the apple and pear, shot hole, and other fungus diseases must be kept in check. As various sprays are required for all of these troubles, the necessity of always having a clean pump is evident.

At the present time the best spray for peach aphis is nicotine sulphate, and the same spray may also be used for the pear slug. Arsenate of lead is the better spray for this latter insect, but it should not be used when the fruit is approaching the ripening stage; hellebore may also be used for the slug with good effect.

As a preventive against codlin moth, the trees should be kept well sprayed with arsenate of lead. The first spraying should have been given at the time of the falling of the petals; the second spraying, owing to the rapid expansion of the fruit, should be given a fortnight later. After that the grower must use his own judgment as to the necessity for subsequent sprayings. If the moths be at all prevalent, other sprayings will be quickly necessary.

As the woolly aphis is increasing at this time of the year, it will mean a saving of a large number of buds if this insect be sprayed. Nicotine sulphate, pine spray, or lime sulphur may be used with good effect.

Cultivation.

The work of ploughing and harrowing should be completed immediately. All crops for green manure should be now under cover, and if the orchard soil is at all heavy or stiff, the grower should make up his mind to grow a crop next season, in order that this condition may be reduced.

The orchard should be kept free from weeds, not only for the conservation of moisture, but in order to do away with all hiding places of the Rutherglen fly, cutworm moths, &c.

General Work.

Grafted and newly-planted trees should be frequently examined, and given an occasional watering and overhead spraying, in order to encourage their growth, and to prevent loss of moisture from the foliage. It is also advisable to mulch young trees with light grass, or straw mulching not too rich in animal manure.

The disbudding of unnecessary shoots and the pinching back or stopping of growths, to prevent their becoming unduly long, may now be carried out. This work is particularly important on young trees.

Graft ties should be examined, and the ties cut wherever any growth is being made. Where the grafts are likely to make any long growth, they should be well staked and tied.

Citrus trees may be planted out, and, after planting, they should be watered and mulched.

The Vegetable Garden.

Tomato plants should now receive attention every day; laterals will require pinching back; crowded bunches and shoots should be thinned; the plants should be well tied to the stakes, and liberal supplies of water and manure should be given. One or two more plantings of tomato plants may still be made, so that there may be strong, sturdy plants for the production of late fruits. By planting three or four successions of plants, it is possible to have a good supply of fruits from December to June. Pull up and burn all plants showing any signs of disease.

Celery may now be sown for winter crops. French beans should be largely sown. Cucumber, melon, pumpkin, and all seeds of this family may now be sown in the open.

Where these plants are already growing, the longest and strongest runners may be pinched back, to throw the strength into flowering and lateral growths. Watch the plants for mildew, and use sulphur freely wherever present, especially on the young plants.

Peas, lettuce, radish, turnip, cabbage, and sweet corn seeds may be sown this month. Seedlings from former sowings may be planted out, and it would be well to dip the whole plant in water before planting This greatly assists the young plants while taking hold of the soil in their new location.

Frequent waterings and frequent cultivation will now be necessary; and all weeds must be hoed or hand-weeded out; mulching with stable manure will greatly assist the plants.

A few beds should now be deeply worked, adding a liberal dressing of stable manure. These plots will then be ready for the celery, cabbage, and other seeds planted during this month.

The Flower Garden.

Continue to plant out the various bedding and foliage plants, corms of gladioli, and seed of such tender annuals as Phlox Drummondi, balsam, zinnia, nasturtium, celosia, aster, cosmos and portulaca.

While seeds planted out in the open germinate and grow fairly well, it is advisable during the summer months to plant these in sheltered seed beds, or in a canvas or calico frame. The protection need be on the one side only, preferably the west or north-west; the seedlings are then protected during the hottest part of the day. At the same time the shading should not be sufficient to unduly "draw" them.

The seeds should not be deeply sown, and all waterings should be light. A little water, often, should be the rule for seedlings. Annuals require plenty of room when planted out in the garden. Being quick growers, they are generally gross feeders, and they must have space to develop a good root system. Feeding, too, with liquid manure is helpful when they are reaching the flowering stage.

Dahlias may now be planted out, either from tubers or from young rooted cuttings. These will give good early summer blooms. For autumn and show blooms, the planting should be deferred until the middle of December.

Herbaceous and succulent plants should be staked for protection; included in this section are delphinium, gladiolus, perennial phlox, rudbeckia, &c. These plants will all benefit from liberal mulchings and watering with liquid manure when approaching the blooming period. Spring flowering bulbs, corms, and tubers should now be lifted and stored.

The soil surfaces will now benefit from frequent hoeings and stirrings. Constant waterings will be required if the weather be hot or windy, the cultivation should quickly follow the waterings in order that the moisture may be thoroughly conserved. Mulching with stable manure is also beneficial at this season.

REMINDERS FOR DECEMBER.

LIVE STOCK.

Horses.—All farm horses in constant work at this season should be well fed with last year's chaff or a mixture of old and new, to which a liberal supply of oats has been added. New chaff or hay alone is not recommended, as it has not the sustaining powers of old hay, and is liable to give rise to digestive troubles. Horses require water at frequent intervals; keeping them for a long time without water, and then allowing them to drink to excess is injurious.

An occasional feed of green stuff will be beneficial. In the event of this being unobtainable, give at week-ends a bran mash, to which is added five or six packets of Epsom salts.

Mares which are away from foals for any length of time should have a portion of milk taken from them before foal is allowed to run with them, otherwise serious results may accrue to foal. Good results follow an allowance of chaff and oats to mares and foals running in paddocks, more especially where feed is short.

At this season the Bot Fly is about, and horses should be frequently examined for the eggs of this fly. The neck, forelegs, and jaws are the parts where the eggs are deposited. Either the use of the singeing lamp under affected parts or the application of kerosene will destroy the eggs.

CATTLE.—Provide succulent fodder and plenty of clean water and shade. The silo is the cheapest method of providing succulent fodder, silage costs less than 10s. per ton to grow and save. Mow and make hay of as much grass as possible. This will keep indefinitely so long as it is protected from the weather. Mice will not work in it. Limewash the cowbails, it helps to keep down flies. Provide "lick" in trough, consisting of salt 40 lb., bone flour 20 lb., lime 25 lb., sulphur 15 lb., pot. iod. 5 oz. Look out for milk fever. Read up method of treatment in *Journal of Agriculture* for November, 1922. Have cows' milk weighed, and tested for butter-fat. Rear heifer calves from cows giving satisfactory results. Continue giving milk at blood heat to calves. Be careful to keep utensils clean, or diarrhœa will result. Do not give too much milk at a time for the same reason. Give half a cup of limewater in the milk to each calf. Let them have a good grass run or lucerne, or ½ lb. crushed oats each per day in trough. Dehorn all dairy calves, except those required for stud or show purposes.

PIGS.—*Sows.*—Supply those farrowing with plenty of short bedding in well ventilated sties. Those with litters old enough may be turned into grass run. *All* pigs should be given a plentiful supply of clean water. Read Bulletin No. 16. Pig raising and fattening with present price of pollard and bacon should be profitable.

SHEEP.—Shearing should now be over except in the case of a few late lambs in the wetter parts of the State. All faulty-mouthed ewes should be disposed of as fats; if not fat they should, if possible, be fattened for sale. Inferior-fleeced ewes should also be sold. Ewe lambs intended to be held for future breeding should have been classed, and only the best retained.

December, January, February, and March are the joining months, the time varying with climatic conditions of different districts. Lambs will be dropped 150 days after service. It is a mistake to try to lamb down early in the later districts.

Leave the rams with the ewes for seven weeks in case any ewe should come into season a second time. Join 2 per cent. of two-tooth four-tooth, six-tooth, and eight-tooth rams, or 3 per cent. of older rams with the flock; with fine-woolled Merino rams 3 per cent. of two-tooths is advisable. Rams should be in good condition. Pare their feet and clean wool and burrs from around eyes and pizzles before joining.

Breeding ewes should be of one breed or cross, and should be culled, so that the wool of the progeny will be as even in quality as possible. This precaution would also ensure an even dropping of lambs. Merinos and fine-woolled ewes come into season first; half-bred and strong-woolled crosses later; all sheep with a preponderance of British blood are even later still. It is useless to join rams with ewes until their proper time for coming into season. Rams may be active, but ewes will not conceive until in season.

Preparation should be made for dipping, and this important operation must be carried out. Mix dip thoroughly and in the manner indicated in directions. Leave sheep in yards overnight before dipping. If possible, dipping should not be done during hot weather.

POULTRY.—Add a little pearmeal to morning mash and give less bran. Feed equal parts wheat and heavy oats at night. Supply plenty of green food—at this time, lettuce is invaluable. Avoid salt meat of any description. Keep ample supplies of sand, ashes, &c., in pens, and moisten same. This will enable the birds to keep themselves cool and clean. Top off geese, ducks, and cockerels for the Christmas markets. Hens will do better this month by having free range. Remove all male birds from flocks, as infertile eggs will keep longer and command a higher price.

BEEKEEPING.

December is the month for the main honey flow from yellow box and red gum, Swarming is practically over for the season except, perhaps, in late districts. Where there has been more swarming than the owner of the bees desired, and the total yield of honey is the object aimed at rather than increase in the number of colonies, the weaker stocks may be united at the commencement of the honey flow, as the highest return is secured by having a given number of bees in the fewest possible number of hives; that is to say, 50,000 worker bees in one hive will store a far greater amount of honey than the same number in two hives with 25,000 bees in each. Such a large worker-force requires three bodies of full-depth frames, otherwise the best results cannot be obtained, because nectar being as thin as water when brought in by the bees, only a little is put into each cell to hasten evaporation. When, therefore, sufficient empty combs are not available to the bees, part of the worker-force will be idle.

Each colony should have at least three sets of Langstroth size combs, and when these are not available the time of the red gum honey flow is suitable for getting new combs drawn out from full sheets of foundation. Comb foundation is expensive, but in the end combs built from starters are more expensive still, because so much drone comb is built when starters only are given, that one of the principal advantages of the frame-hive system is lost.

All frames should be wired, four horizontal wires being most in favour with beekeepers; the wires should be well embedded into the foundation so that it may not come away from them. Between the bottom edge of the sheet of foundation and the bottom bar of the frame there should be a space of at least ⅜-inch, to allow for the expansion of the sheet by the heat of the hive.

The best combs are obtained when the foundation is drawn out by the bees in the super immediately over the brood nest without an intervening excluder.

Combs should be capped at least two-thirds before being extracted, so that the honey will be of good density. When hives are run three stories high, as indicated above, there is no necessity to extract all the honey at one time; one set of combs can be extracted, and the empty combs returned to the hive, and when they are partly filled again the others can be taken. In this way the bees are not upset so much as when all the combs are wet and sticky after extracting, and the risk of leaving the hive destitute of stores is avoided should the honey flow suddenly cease.

CULTIVATION.

Farm.—Cut hay in late districts. Cut oats and barley in early places. Finish planting potatoes. Put in late maize for fodder, also millet and imphee. Plough fire-breaks where required. Get stackyard and stages ready for hay.

Orchard.—Keep the surface loose and free. Suppress weeds. Spray as often as necessary for codlin moth and pear slug. Mulch and spray young trees and grafts with water in the early morning during hot weather.

Vegetable Garden.—Keep the surface hoed, and allow the plants plenty of moisture. Stake, pinch out, manure, and water tomatoes. Pinch back long runners of pumpkin and melon family. Sow autumn and winter varieties of cabbage and cauliflower. Plant out seedlings in cool weather. Sow French beans. Cease cutting asparagus beds, and top-dress with manure.

Flower Garden.—Plant out dahlias and gladioli for autumn blooming. Lift and store spring flowering bulbs. Stake, tie, and train growing plants. Sow zinnias and asters. Layer carnations, camelias, daphnes, &c. Water well and keep the surface loose. Keep rose beds fairly dry.

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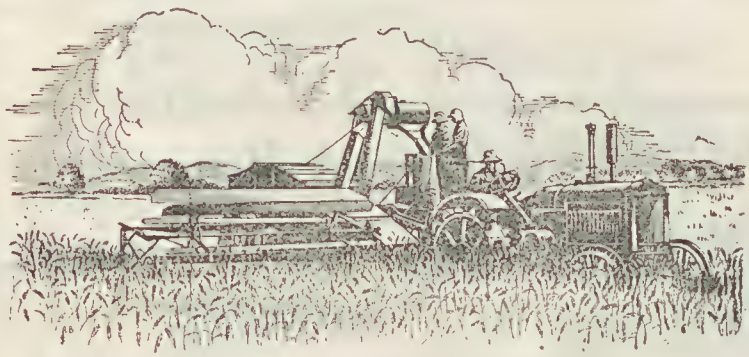

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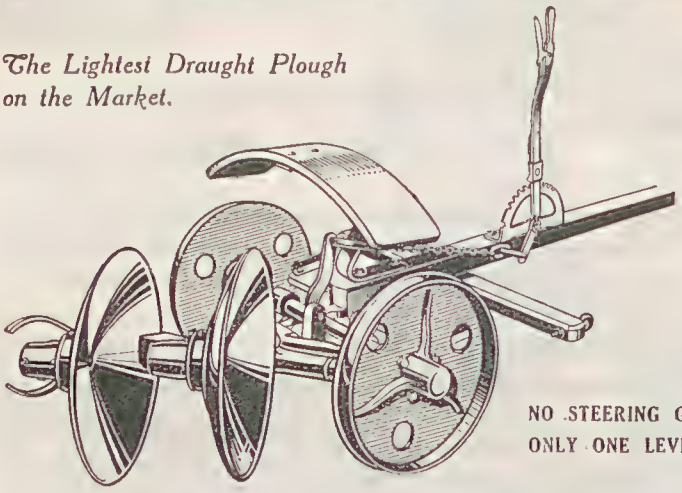

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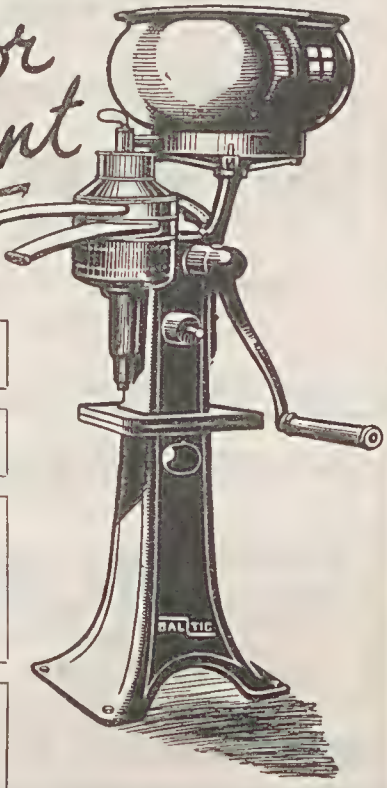

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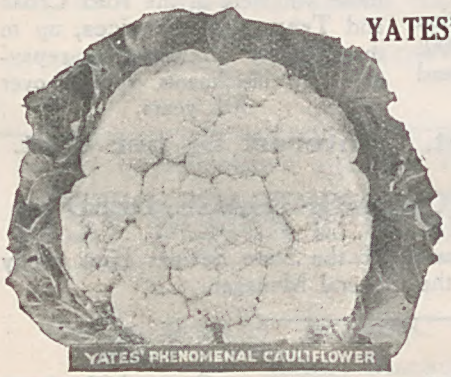
CABBAGES and CAULIFLOWERS

For Early Market Sowings



YATES' "PHENOMENAL EARLY" CAULIFLOWER

A very fine early variety maturing in about four months. The heads are of good size, close-grained, and of splendid colour. We have received numerous reports about the good qualities of this and **"Phenomenal Maincrop"** and they are rapidly becoming the two biggest sellers in our list.

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A magnificent maincrop cauliflower which, in our opinion, will soon be the standard maincrop variety in Australia. It matures in about six months and the results which have been obtained with this variety even in difficult seasons, have been remarkable.

Both Varieties—5/- oz. 15/- ¼ lb. 45/- lb.
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This seed is imported direct from the originator each season and only this seed is supplied under this name.

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A fine early market sort producing a splendid quality short-stemmed cabbage with very solid round heads. Heads in surely and evenly and can be planted fairly close together.

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All quotations submitted and all orders accepted are subject to our printed conditions of sale.

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DEPARTMENT OF AGRICULTURE, VICTORIA

Red Poll Dairy Herd

The Department has now completed the orders for calves that were booked ahead of calving when the advertisement was withdrawn; consequently the booking of orders for bull calves from the forthcoming calvings has now been resumed.

BULL CALVES are sold for delivery at a month old at prices based approximately on the actual milk and butter fat record of the dam at the rate of 1s. per lb. of butter *fat* yielded. Thus a calf from a cow with a 400 lb. butter fat record is sold for 20 guineas, one from a 300 lb. butter fat cow for 15 guineas, and so on. Bull Calves ex heifers on their first calf are sold for a set price of 10 guineas.

(For Record of Yields of dams see Red Poll Herd Book.)

SIRES IN USE:

VICTORIA VOLCANO (322 A.)

Sire: Nicotine (69 A.A.) by Acton Dewstone (imp.) 9524 (4 A.A.).
Dam: Tonga (253 A.) by Honingham Archbishop (imp.) 9702 (48 A.A.).

Tonga's butter fat yields for 6 successive lactation periods are as follow:—1916, 341 lb.; 1917, 398 lb.; 1918, 419 lb.; 1919, 479 lb.; 1920, 428 lb.; 1921, 562 lb.

BELLIGERENT (Imported) 11096 (8 A.A.)

Dam's Record (1st milking) 7144 lb. milk.

Dam's Dam's	,,	14533 lb. milk	...	4 years average		12871 lb. milk.		
Sire's Dam's	,,	10370	,,	...	7	,,	,,	9354	,,
Sire's D. Dam's	,,	9510	,,	...	12	,,	,,	8033	,,
G. Sire's D. Dam's	,,	10215	,,	...	7	,,	,,	9386	,,
G.G. Sire's D. Dam's	,,	12565	,,	...	10	,,	,,	8853	,,
G.G.G. Sire's D. Dam's	,,	10088	,,	...	2	,,	,,	9754	,,

BIT O' 'BACCA (Vol. 3)

Sire: Nicotine (69 A.A.) by Acton Dewstone (imp.) 9524 (4 A.A.).
Dam: Nictitana (311 B.) by Nicotine (69 A.A.).

Nictitana's butter fat records for 6 successive lactation periods are as follow:—1918, 450 lb.; 1919, 396 lb.; 1920, 393 lb.; 1921, 465 lb.; 1922, 524 lb.; 1923, 536 lb.

Inspection of the Herd is Invited.

Visitors will be met at the Station on notifying the Manager, State Research Farm, Werribee.

Application for purchase to

Dr. S. S. CAMERON, DIRECTOR OF AGRICULTURE, MELBOURNE.

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